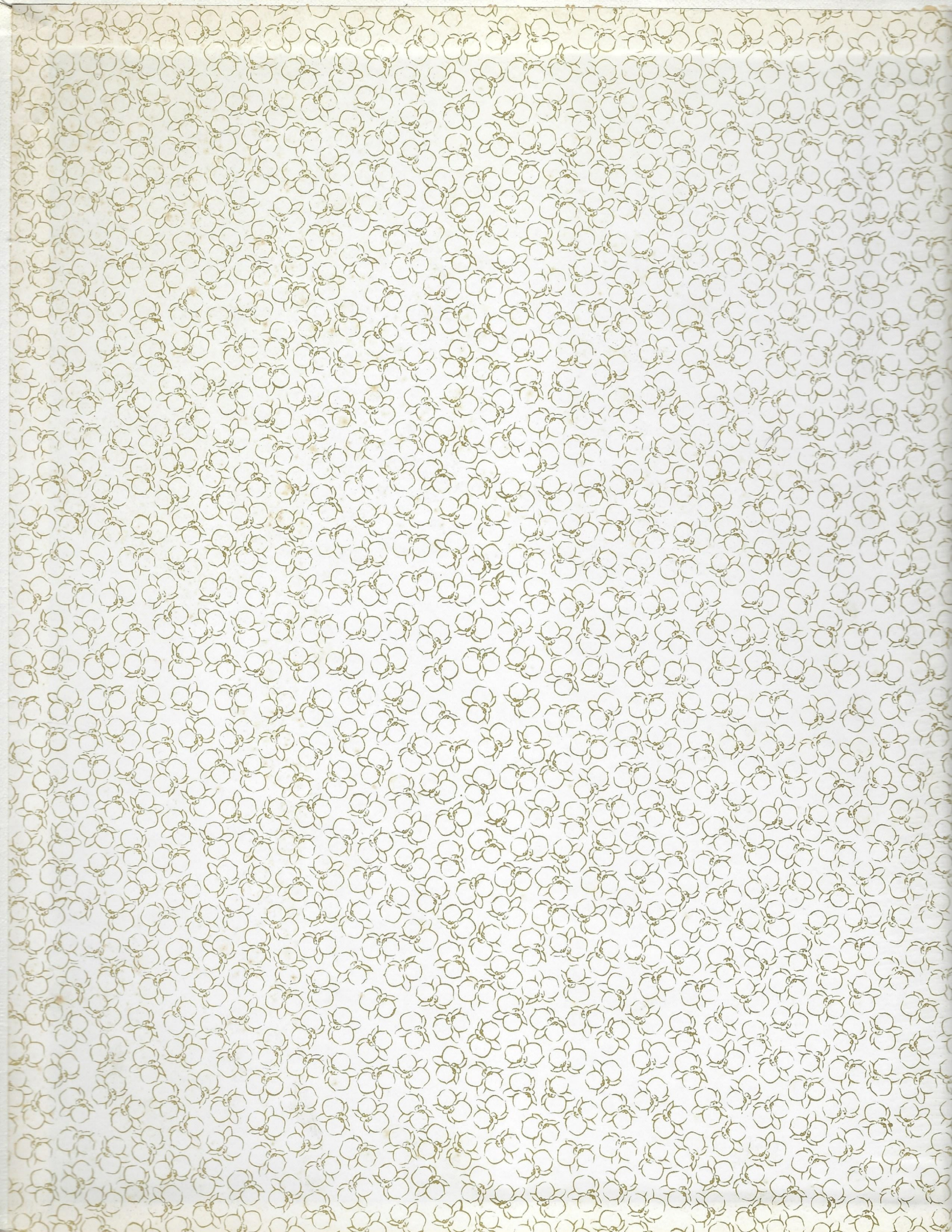
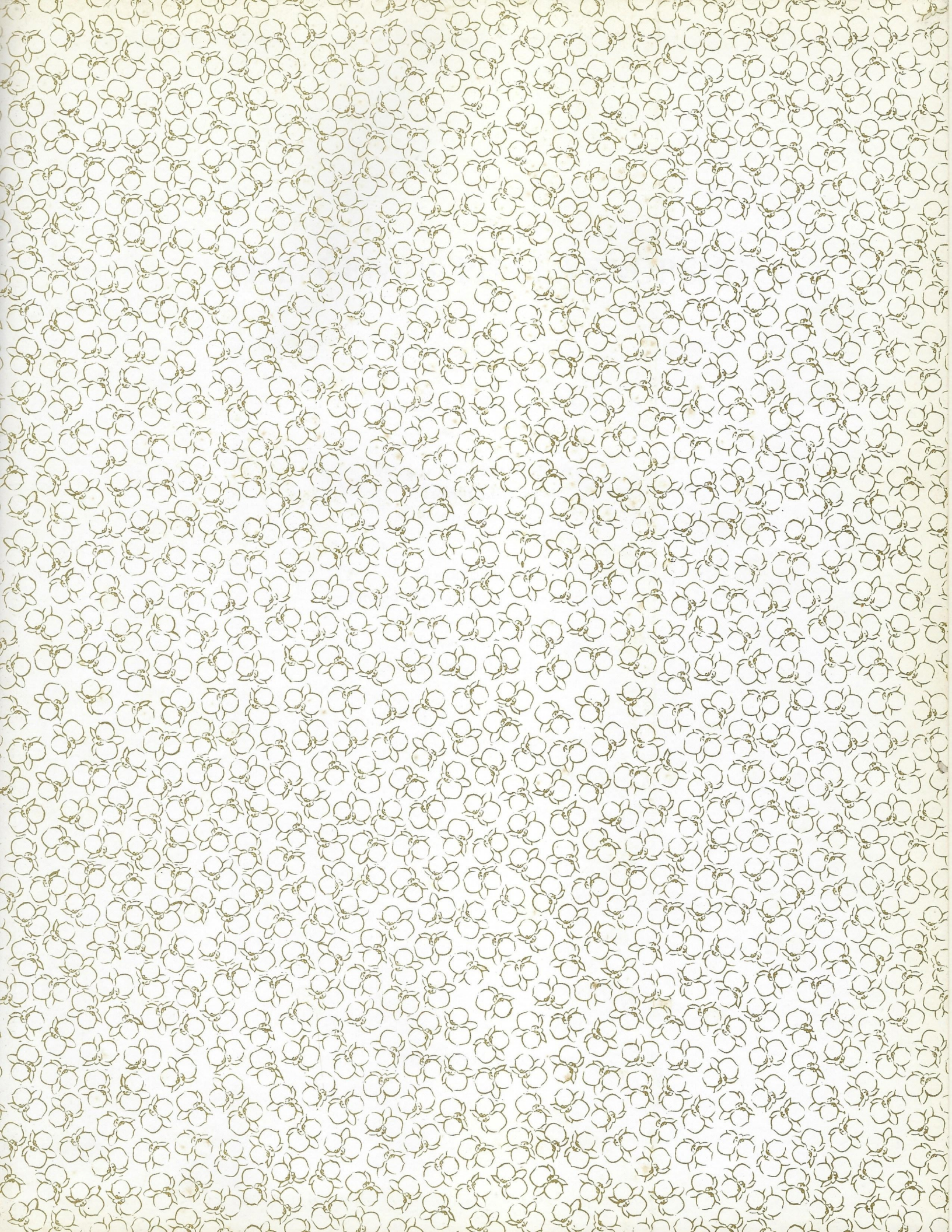
the GENUS PHALÆNOPSIS

BY HERMAN R. SWEET Ph.D.

the ORCHID DIGEST

ORCHIDS OF THE WORLD VOLUME 1





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To
Leslie A. Garay
and to the memory of the late
George C. Kennedy
for their vital roles in making this book
a printed reality.

PROLOGUE

In October 1969, when the final number of the serialized publication of my "Revision of the Genus Phalaenopsis" appeared in the American Orchid Society Bulletin, I noted the event with much satisfaction, for a big undertaking had been brought to completion. In retrospect, it is obvious that the availability of detailed descriptions of every known species, including reproductions of original documents and new line drawings of floral details, has stimulated the interest of orchidophiles in this genus far beyond expectation. At that time 500 sets of reprints were bound together as a paperback, in addition to the 11,000 circulation of the American Orchid Society Bulletin. The demand for the collated copies rapidly exhausted the supply, thereby creating a vacuum. In response to that increased interest, between 1970 and 1973, I wrote a series of popular articles, "Observations on the Genus Phalaenopsis," which was published in the pages of the Orchid Digest. As a consequence of these two sets of publications the plants grown today commercially or by amateurs for the most part are correctly named, the opposite of which was true before. In this enterprise we, the orchidophiles and orchidologists, share equally the knowledge and satisfaction that jointly we managed to bring stabilization into the once chaotic field of *Phalaenopsis,* notwithstanding the arbitrary standards of the International Registration Authority for Orchid Hybrids of the Royal Horticultural Society, London, England.

During the past five years I have been repeatedly urged by my colleagues and friends, especially by Dr. George C. Kennedy, University of California, Los Angeles, to update the original "Revision of the Genus Phalaenopsis." This book is my answer to their persuasions. This is not a reprint, but a new presentation based on the above-mentioned two series in the American Orchid Society Bulletin and the Orchid Digest. Moreover, it incorporates all the new data that has appeared in print during the intervening time, as well as all the new insight and understanding I myself have gained.

This book does not include chapters on growing Phalaenopsis plants for that information is already available in many books dealing with orchid culture.

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FOREWORD

(to the paperback of collected reprints)

With the completion of the serial publication of my revision of the genus *Phalaenopsis,* I have been asked by a number of friends and colleagues to combine the articles of this series into a single volume. Since the original publication did not provide an opportunity to include all of the citations of specimens which I studied from various herbaria, the suggestions of book form seemed to be the best medium to correct this shortcoming. The material at hand is voluminous. Consequently at the end of the eight parts a special section is devoted to the enumeration of specimens. It should be noted that after each specimen examined a symbol is used to indicate the particular herbarium where the specimen is located. The abbreviations or symbols are taken from the last edition of Index Herbariorum.

It is appropriate here for me to offer a few comments in retrospect concerning the treatment of the genus. There has been some criticism concerning my usage of certain subspecific categories. While the botanical *"varietas"* and the horticultural "variety" are not equivalent terms, I did not make any attempt to identify the two separate categories. Although I am fully aware that a large number of the so-called *varietates* by Reichenbach, Rolfe and others stand for horticultural varieties, I have maintained them in the sense as they were published according to the rules of the Botanical Code, namely botanical *varietates.* Therefore, my enumerating the great majority of these so-called *varietates* helps to document some of the known range of variation in nature. On the other hand, reduction of these *varietates* into synonymy would simultaneously eliminate at least for horticulturists the acquaintance with this extensive natural variation. It should be kept in mind that although these *varietates* are based on material of horticultural origin, the actual specimens were invariably fresh introductions from nature. Moreover, the separate inclusion of these *varietates* could prevent future duplication of efforts for it is common practice among growers to attach names to distinct variations.

With respect to the nine sections which I have established, I feel that their circumscription and the species assigned to them is sound. The exception to this statement may be the section *Amboinenses* of which I have seen relatively little material. It is possible that future students of the genus *Phalaenopsis* may find it necessary to fragment it, although at this point I would find it difficult to provide a sound basis for such an action.

In conclusion I wish to express my own personal satisfaction in preparing this monograph which is aimed at both the scientific and horticultural audiences. If I have succeeded in this attempt, it is due in no small measure to the support which I have received from botanists and horticulturists. Phalaenopsis is both a botanical and horticultural genus, hence my findings are based on classical herbarium material as well as on living plants. For the purpose of clarity the salient features by which each species can be recognized readily are depicted in line drawings often supplemented by color reproductions.

INTRODUCTION

Because of the current Phalaenopsis breeding programs by amateurs and professional horticulturists and because the correct identification of the species used in crosses is of utmost importance in hybrid registration, the American Orchid Society, Inc., in 1966, awarded a grant to the Orchid Herbarium of Oakes Ames, Harvard University, for revising the constituent species of the so-called "Lueddemanniana complex" in the genus.

In recent years the species in the "Lueddemanniana complex" have been used extensively in breeding in an attempt to obtain more intensely colored flowers for both the horticultural and floricultural trade. The early hybridizing programs utilized mostly the large-flowered species, such as *Phalaenopsis amabilis* (L.) Bl., *P. Aphrodite* Rchb.f., *P. Schillerana* Rchb.f., *P. Sanderana* and *P. Stuartiana* Rchb.f., the progeny of which gave predominantly white or pastel-colored flowers. Today, hybridizers are successful in producing more colorful hybrids with large-sized flowers in shades of magenta and yellow. Since most of these hybrids are registered, there has arisen in a number of instances a difference of opinion as to the identity of species used for the parents. This has been especially true when species of the "Lueddemanniana complex" were involved. It was for this reason that this study was undertaken to determine what species are referable to this complex on the one hand, and on the other to determine what criteria can be used by the hybridizers for the correct identification of plants.

In order to establish the limits of variation of each species and its correct identity, herbarium specimens in addition to the type-specimens of every known species were sought for research. Loans were arranged from the Reichenbach Herbarium, Wien, Austria, and from the State Herbarium, Leiden, Netherlands. These two collections, together with the extensive holdings of the Orchid Herbarium of Oakes Ames, Harvard University, have supplied information on approximately 90% of the known described species. The remaining type-specimens were studied by me during two visits to European herbaria: the Herbarium of the Royal Botanic Gardens (including the Lindley Herbarium), Kew, England; the British Museum of Natural History, London, England; the National Herbarium of Belgium, Bruxelles, Belgium; and the State Herbarium, München, Germany.

Botanical libraries have also been of utmost importance in locating original descriptions and illustrations of species and varieties. Extensive use has been made of the library at the Orchid Herbarium of Oakes Ames and the combined libraries of Gray Herbarium and Arnold Arboretum, Harvard University, as well as the library of the Royal Botanic Gardens, Kew, England, and of the British Museum of Natural History, London, England.

This study has also been greatly aided by the cooperation of a large number of orchid growers, both professional and amateur, who have sent in flowers which they have had at their disposal. The coordination of herbarium material and that of living specimens no doubt has helped to make this study unique, for neither the herbarium material nor the living specimens alone could provide results satisfactory from both the scientific and horticultural point of view.

Soon after the study of the "Lueddemanniana complex" had been started, it became evident that it was impossible to assess that complex without a basic taxonomic revision of the whole genus. In revising a genus, there is the problem of determining the appropriate characteristics or criteria for the delimitation of each species. It should be borne in mind that individuals of species vary and there are always problems with those which have rather extreme variations. Moreover, it is not always easy to interpret original descriptions and illustrations, for the features or characteristics now essential for identification are not always shown or are omitted, because at the time of publication they were not considered to be of diagnostic value.

In this presentation I have attempted a dual approach, keeping in mind the needs of both horticultural and scientific audiences.

The information about each species is based primarily on the extant type material. Consequently this study is essentially a systematic revision of the genus. In preparing the revision various horticultural aspects have been considered and emphasized. Although many of the horticultural varieties do not exhibit any morphological differences, their distinction based on color warrants recognition as separate entities, because of their importance in current breeding programs. However, it is necessary to be cautious in applying names to every color variant within a given species. As long ago as 1882, Reichenbach (Gard. Chron. n.s. 17:330, 1882) warned us when he said, "As we are not rich in grand novelties, there is a very pronounced tendency to break up the immense masses of some species into varieties. There is a great difficulty in avoiding hairsplitting, and the practice of naming individual plants whose differences are so slight, that the next individual may break down the character, or whose flower in the next season may present just the same claim for new names, though indeed they may be borne on the same plant."

One essential fact has emerged during the preparation of this revision which must be emphasized for everyone who wishes to use the information here presented for the identification of plants. It is that the basic criterion in differentiating closely allied species depends upon the kinds of callosities to be found between the lateral lobes and also on the midlobe of the lip. Therefore, for the inspection of the callosities it is necessary that the lateral lobes be separated so that they may be examined with the aid of either a magnifying lens or a dissecting microscope. The pen-and-ink drawings depicting the lip structure of various species have been prepared in that position to facilitate the recognition of these diagnostic characteristics. Where further

information is needed, supplementary drawings, whether they represent floral patterns or variations in the arrangements of the callosities, have been added. *Each illustration is a true representation of the type specimen.* Moreover, in this presentation, where possible, each species has been documented with the reproduction of the original sketches either in watercolor or in black and white, as they were prepared at the time of publication.

Finally, it should be stated that even though all available material was used in the preparation of these articles, it is expected that further variations in the basic patterns will be found in some or all of the species.

Relationships

The genus *Phalaenopsis* was assigned by Bentham, Pfitzer and Schlechter to the subtribe *Sarcanthinae,* native to the Old World. The genera in this subtribe are divided into two *grexes* on account of the presence or absence of a column-foot. Recently Holttum has employed the degree of cleftness in the pollinia as a basis of a new phylogenetic scheme for the *Sarcanthinae.* However, neither of these two morphological characters is of significance in evaluating relationships. As a matter of fact, if such criteria are used, several closely related genera will become widely separated. On the other hand, the recent crosses reported in the literature between species of *Phalaenopsis* and other genera — *Aerides, Arachnis, Ascocentrum, Doritis, Neofinetia, Renanthera, Rhynchostylis, Vanda* and *Vandopsis* — show varying degrees of fertility, a clear indication of a line of consanguine origin. This genetic compatibility is a more sound expression of a probable phyletic line than the other phenotypic expressions mentioned above. This situation is clearly reflected in the genetic behavior of the so-called "terete-leaved" *Phalaenopsis* species — now called *Paraphalaenopsis* — which freely hybridize with species of a number of genera other than *Phalaenopsis.*

This whole group of genera may be viewed as one supergenus clustered around *Vanda* and one that has evolved through *Sarcochilus* and *Thrixspermum* from a common vandaceous stock. During the course of evolution of this group, among the isolating barriers promoting speciation on the one hand, and establishing phyletic lines on the other, the most successful ones were the ecological, physiological and geographic isolations, whereas genetic incompatibility remained of secondary importance.

History of Classification

The first species referred to the genus *Phalaenopsis* was *Phalaenopsis amabilis* (L.) Blume which has had an interesting career concerning its identity. Originally it was described from the Island of Amboina by Rumphius, in 1750, in Herbarium Amboinense under the polynomial *Angraecum album majus.* In 1753, Linnaeus, in the first edition of his Species Plantarum, called it *Epidendrum amabile,* based on specimens which were sent to him by Osbeck. These specimens are still in a remarkably good state of preservation in the Linnean Herbarium in London. In 1814, Roxburgh in Hortus Bengalensis transferred it to the genus *Cymbidium,* as *Cymbidium amabile.* Ultimately in 1825, Blume established the genus *Phalaenopsis* in Bijdragen Tot de Flora van Nederlandsch Indië and made the combination now known as *Phalaenopsis amabilis* (L.) Blume, thus establishing the type species for the genus.

There have been many accounts and revisions of the genus *Phalaenopsis.* The first was presented by Reichenbach in Hamburger Garten-und Blumenzeitung, in 1860, which, two years later, he enlarged in Xenia Orchidacea, accounting for eleven species still considered valid today. He divided the species into two groups, based on the presence or absence of appendages at the apex of the lip.

In 1882, Burbidge in The Garden, listed twenty-four species of *Phalaenopsis,* including several varieties, dividing them in the same manner as Reichenbach had done.

In 1883, Bentham in the third volume of Bentham and Hooker, Genera Plantarum, was the first to propose two named sections, *Euphalaenopsis* and *Stauroglottis,* based on the width of the petals, and the presence or absence of appendages at the apex of the lip. He gave a conservative estimate of fifteen species in the genus.

Rolfe in Gardeners' Chronicle, in 1886, gave the first complete revision of the genus, recognizing four sections based on the characters of the floral segments as follows:

"Section I. *Euphalaenopsis* Benth. & Hook.f. — Petals much broader than sepals, roundish in outline, the upper edge much more curved than the lower one and the base much contracted; lips with a pair of antenna-like appendages at the apex; the appendages sometimes reduced to a pair of short teeth, column without proboscis-like rostellum.

"Section II. *Proboscidioides* — Sepals and petals as in *Euphalaenopsis,* lip without apical appendages; column with a long proboscis-like rostellum and singularly like an elephant's head and trunk — hence the name.

"Section III. *Esmeralda* Rchb.f. — Petals not or scarcely broader than sepals; lip without apical appendages, but with a pair of slender linear appendages on the stalk of the lip below the lateral lobes.

"Section IV. *Stauroglottis* Benth. & Hook.f. — Petals not or scarcely broader than sepals; lip variously shaped, but without apical appendages of the section *Euphalaenopsis,* or the basal appendages of the section *Esmeralda.*"

Pfitzer in Engler and Prantl, Die Natürlichen Pflanzenfamilien, in 1889, adopted Rolfe's sections, but renamed the section *Esmeralda* as *Antennifera* Pfitz. and proposed a new section, *Zebrinae* Pfitz. which he separated from the section *Stauroglottis* on the basis of the midlobe of the lip being longer than wide.

Quisumbing in the Philippine Journal of Science, in 1947, was the last one to attempt a revision of the genus *Phalaenopsis.* He accepted Pfitzer's classification, and his

discussions are restricted to those members of the genus found in the Philippine Islands.

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My special appreciation goes to the directors and curators of the various herbaria who have kindly provided specimens on loan or working space during my visits to their institutions.

It is befitting to mention here the extensive collections, as well as the excellent library and facilities of the Orchid Herbarium of Oakes Ames, Botanical Museum of Harvard University, where this study was completed.

In any monographic work, one of the most necessary phases of study, in addition to critical examination of specimens, is the research pertaining to the literature. Without an access to the world-renowned combined libraries of the Arnold Arboretum and the Gray Herbarium of Harvard University, this study would have been less complete.

A special acknowledgment is made also here to the American Orchid Society's Committee on Research and to the American Orchid Society's Fund for Education and Research for the financial help provided in defraying the costs of the preparation of the line drawings, for without these illustrations the revision of the genus *Phalaenopsis* would have been less understandable to the horticultural world.

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SPECIMENS HAVE BEEN EXAMINED FROM THE FOLLOWING HERBARIA

AAU	Herbarium Jutlandicum, Aarhus, Denmark.
AMES	Orchid Herbarium of Oakes Ames, Harvard University.
BM	British Museum of Natural History, London, England.
BO	Herbarium Bogoriense, Bogor, Indonesia.
BR	Jardin Botanique de l'Etat, Bruxelles, Belgium.
C	Botanical Museum and Herbarium, Copenhagen, Denmark.
CAL	Central National Herbarium, Calcutta, India.
E	Royal Botanic Garden, Edinburgh, Scotland.
JCB	St. Joseph's College, Bangalore, India.
K	Royal Botanic Garden, Kew, England.
L	Rijksherbarium, Leiden, Netherlands.
LINN	Linnean Society of London, London, England.
M	Botanische Staatssammlung, München, Germany.
NY	New York Botanical Garden, New York, N.Y.
P	Museum National d'Histoire Naturelle, Paris, France.

PNH Philippine National Herbarium, Manila, Philippines.
SING Herbarium of Botanic Gardens, Singapore.
TAI National Taiwan University, Taipei, Taiwan.
U Botanical Museum and Herbarium, Utrecht, Netherlands.
US U.S. National Museum, Dept. of Botany, Washington, D.C.
W Naturhistorisches Museum, Wien, Austria.
Z Institute für Systematische Botanik der Universität Zürich, Zürich, Switzerland.

SYSTEMATICS OF THE GENUS

Reclassification of the Genus

As a result of the examination and study of literally hundreds of herbarium specimens, as well as a large number of living flowers, I have presented in the American Orchid Society Bulletin in 1968 a new classification which I still uphold in this book. The work of my predecessors has been seriously considered, and followed whenever it is possible. While rearranging the species and their distribution into sections, I believe that I have reached a classification in which natural alliances have received appropriate expression.

Sections of the Genus

Section **PHALAENOPSIS*** (Benth. in Journ. Linn. Soc. 18:332, 1881); Sweet in Amer. Orch. Soc. Bull. 37:872, 1968.

Sect. *Euphalaenopsis* Benth. in Benth. & Hooker, Gen. Pl. 3:573, 1883.

In this section the species have broad transverse petals as found in the flowers of *Phalaenopsis amabilis* (L.) Blume. The apex of the lip is always divided into either bifid or two cirrhi-like projections.

This section is characterized as follows:

Petals much broader than sepals, roundish in outline, the upper edge much more curved than the lower one and base much constricted; lip with a pair of antenna-like appendages at the apex; sometimes reduced to a pair of short teeth; column without a long proboscis-like rostellum.

Type: *Epidendrum amabile* L. = *Phalaenopsis amabilis* (L.) Blume.

Section **PROBOSCIDIOIDES** Rolfe in Gard. Chron. n.s. 26:276, 1886; Sweet in Amer. Orch. Soc. Bull. 37:872, 1968.

This section contains but one species, *Phalaenopsis Lowii* Rchb.f., which is very similar to species in the section *Phalaenopsis;* the basic difference is in the shape of the column and the acirrhous apical midlobe of the lip.

This section is characterized as follows:

Petals broader than sepals; midlobe of lip entire, without apical appendages; column with a long proboscis-like extension to the rostellum which resembles an elephant's head and trunk, hence the name.

Type: *Phalaenopsis Lowii* Rchb.f.

Section **APHYLLAE** Sweet in Amer. Orch. Soc. Bull. 37: 872, Oct. 1968.

To this section I refer two species from western China and Tibet with a much abbreviated stem and a few deciduous bract-like leaves. Photosynthesis is accomplished by the profusely developed chlorophyll-bearing roots.

This section is characterized as follows:

Stem abbreviated, leaves bract-like, deciduous; inflorescence one- to many-flowered; sepals and petals narrow, similar; midlobe of lip convex, canaliculate underneath, with more or less involute margins.

Type: *Phalaenopsis Stobartiana* Rchb.f.

Section **PARISHIANAE** Sweet in Amer. Orch. Soc. Bull. 37:872, Oct. 1968.

To this section I refer *Phalaenopsis Parishii* Rchb.f. and its related species.

Phalaenopsis Parishii Rchb.f. has been put by A. D. Hawkes into a genus of its own — *Grafia* — on account of the movable midlobe of the lip. Unfortunately, this character alone is insufficient to establish a genus. Moreover, the name *Grafia* has long been pre-empted by *Grafia* Reichenbach, 1837, a genus in the *Umbelliferae,* making Hawkes' name illegitimate.

This section is characterized as follows:

Leaves well developed, often deciduous; inflorescence short and few-flowered; sepals and petals similar in shape, roundish; claw of lip adnate to column-foot at a right angle; midlobe of lip mobile.

Type: *Phalaenopsis Parishii* Rchb.f.

Section **POLYCHILOS** (Breda) Rchb.f. in Bot. Zeit. 22: 298, 1864; Sweet in Amer. Orch. Soc. Bull. 37:873, 1968.

This section comprises a group of closely related species, the type of which was described originally as a distinct genus.

This section is characterized as follows:

Flowers fleshy; sepals and petals similar; lip lobate with gibbous cavity in center; apical lobe of lip more or less anchor-shaped and the base of lip continuous with the column-foot.

Type: *Polychilos cornu-cervi* Breda = *Phalaenopsis cornu-cervi* (Breda) Blume & Rchb.f.

*N.B. According to the International Code of Botanical Nomenclature, the sectional name to which the type species of the genus is referable must be called by the same name as the genus without attributing it to any authority.

Section **STAUROGLOTTIS** (Schauer) Benth. in Journ. Linn. Soc. 18:332, 1881; Sweet in Amer. Orch. Soc. Bull. 37:873, 1968.

This section is limited to those species which are clearly related to the type species.

This section is characterized as follows:

Sepals and petals similar; lip 3-lobed, the disc between the lateral lobes without any protuberances, at junction of lateral lobes and midlobe with a peltate callus.

Type: *Stauroglottis equestris* Schauer = *Phalaenopsis equestris* (Schauer) Rchb.f.

Section **FUSCATAE** Sweet in Amer. Orch. Soc. Bull. 37: 873, Oct. 1968.

The species in this and the following sections have callosities between the lateral lobes of the lip and a keel on the midlobe of the lip. The species belonging to this section form a natural unit and are closely interrelated.

This section is characterized as follows:

Sepals and petals similar, spreading; margins recurved; lip continuous with column-foot; midlobe of lip concave or flat, with one to several keels or ridges; central keel always fleshy.

Type: *Phalaenopsis fuscata* Rchb.f.

Section **AMBOINENSES** Sweet in Amer. Orch. Soc. Bull. 37:874, Oct. 1968.

The species in this section have a more or less full round flower, i.e., the floral segments are broad; the midlobe of the lip is always convex.

The section is characterized as follows:

Flowers rotuliform; petals broadly elliptic, i.e., length is twice or less than width; the midlobe of lip fleshy, always convex with a single thin central keel.

Type: *Phalaenopsis amboinensis* J. J. Smith.

Section **ZEBRINAE** Pfitzer in Engl. & Prantl. Pflanzenfam. 2, 6:12, 1889; Sweet in Amer. Orch. Soc. Bull. 37:874, 1968.

The species in this section form four distinct units or subsections on account of the type of callosities between the lateral lobes of the lip, and the various adornments or absence of adornments on the midlobe of the lip.

This section is characterized as follows:

Flowers stellate, petals narrowly obovate or oblanceolate, i.e., length more than twice the width.

Subsection **ZEBRINAE** (Sweet in Amer. Orch. Soc. Bull. 37:874, 1968).

The disc between the lateral lobes either tuberculate or with denticulate or digitate or superimposed plates or callosities. Column with a cucullate clinandrium.

Type: *Phalaenopsis zebrina* Witte = *Phalaenopsis sumatrana* Korth. & Rchb.f.

Subsection **LUEDDEMANNIANAE** Sweet, *sect. nov.*

Columna clinandrio haud evoluto, marginato, integerrimo donato; labello inter lobos laterales callo varie tuberculato, nunquam simpliciter bifido ornato.

Column with a non-developed, low, marginate, entire clinandrium or anther bed; lip between lateral lobes with variously tuberculate callus, never simply bifid.

Type: *Phalaenopsis Lueddemanniana* Rchb.f.

Subsection **HIRSUTAE** Sweet in Amer. Orch. Soc. Bull. 37:874, Oct. 1968.

The disc between the lateral lobes of the lip with single, bifid callus; midlobe of lip fleshy, convex, incrassate toward the apex and covered with hairs.

Type: *Trichoglottis pallens* Lindl. = *Phalaenopsis pallens* (Lindl.) Rchb.f.

Subsection **GLABRAE** Sweet in Amer. Orch. Soc. Bull. 37:874, Oct. 1968.

The disc between lateral lobes of lip with single bifid callus; midlobe of lip fleshy, convex, incrassate toward the tip and glabrous.

Type: *Phalaenopsis modesta* J. J. Smith.

EXCLUDED SECTION

Section **ESMERALDA** Rchb.f. in Gard. Chron. n.s. 11: 398, 1879.

Syn.: Sect. *Antenniferae* Pfitzer in Engl. & Prantl. Pflanzenfam. 2, pt. 6:212, 1889.

Sect. *Antennorchis* O. Kuntze in Post & Kuntze, Lex. Gen. Phan. 430, 1904.

Sect. *Doritis* (Lindl.) J. J. Smith in Fedde Rep. 32: 366, 1933, *nomen nudum.*

Reichenbach defines this section as follows: ". . . species . . . having small linear spreading side lacinia of the stalk of the lip." He refers *Phalaenopsis Esmeralda* Rchb.f. and *Phalaenopsis antennifera* Rchb.f. to this section. These species are now referable to the genus *Doritis.* Consequently the section *Esmeralda* Rchb.f. is excluded from the genus *Phalaenopsis.*

Mention must be made of a small group of *Phalaenopsis* species, *P. Denevei* J. J. Smith, *P. Laycocki* Henderson, and *P. serpentilingua* J. J. Smith, which have terete leaves. These species have been separated into a distinct genus, *Paraphalaenopsis* Hawkes, on account of the terete leaves and genetic behavior in breeding. Because this latter aspect shows a closer relationship to genera other than the genus *Phalaenopsis,* I consider the separation of *Paraphalaenopsis* justified. A monographic treatment of the genus *Paraphalaenopsis* is given after the genus *Phalaenopsis.*

List of Specific Names Reported in Literature

Prior to the taxonomic treatment of the species in the nine sections, a list of all recorded species attributed to the genus *Phalaenopsis* is given here. In this list are included also those primary hybrids which have been published with descriptions and, thus, are treated as botanical species under the International Code of Botanical Nomenclature.

P. acutifolia Linden	= *P. sumatrana* Korth. & Rchb.f.
P. alboviolacea Ridl.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. alcicornis Rchb.f.	= *P. Sanderana* var. *alba* (Veitch) Stein
P. amabilis (L.) Blume	Sect. PHALAENOPSIS
P. ambigua Rchb.f.	= *P. Aphrodite* Rchb.f.
P. amboinensis J. J. Smith	Sect. AMBOINENSES
P. amethystina Rchb.f.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. × *amphitrite* Krzl.	= *P. Stuartiana* × *P. Sanderana*
P. antennifera Rchb.f.	= *Doritis pulcherrima* Lindl.
P. Aphrodite Rchb.f.	Sect. PHALAENOPSIS
P. appendiculata Carr	Sect. PARISHIANAE
P. Babuyana Miwa, *nomen nudum*	= *P. Aphrodite* Rchb.f.
P. Barrii King ex. Hook.f.	= *P. speciosa* var. *tetraspis* (Rchb.f.) Sweet
P. bella Teijs. & Binn.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. × *Bertii* Hasselbr. & Nash	= *P. amabilis* × *P. sp.*
P. × *bogoriensis* J. J. Smith	= *P. amabilis* × *P. gigantea*
P. Boxallii Rchb.f.	= *P. Mannii* Rchb.f.
P. Brautigami J. J. Smith	= *Nomen*
P. Brymeriana Rchb.f.	= *P. intermedia* var. *Portei* Rchb.f.
P. Buyssoniana Rchb.f.	= *Doritis pulcherrima* Lindl.
P. × *casta* Rchb.f.	= *P. Aphrodite* × *P. Schillerana*
P. celebensis Sweet	Section STAUROGLOTTIS
P. celebica van Vloten	= *P. amabilis* var. *moluccana* Schltr.
P. cochlearis Holtt.	Section FUSCATAE
P. Corningiana Rchb.f.	Section ZEBRINAE: Zebrinae
P. cornu-cervi (Breda) Bl. & Rchb.f.	Section POLYCHILOS
P. cruciata Schltr.	= *P. maculata* Rchb.f.
P. Cumingiana Rchb.f., *sphalm*	= *P. Corningiana* Rchb.f.
P. Curnowiana Hort.	= *P. Schillerana* var. *immaculata* (Rchb.f.) Veitch
P. decumbens (Griff.) Holttum. *Nomen*	= *P. Parishii* Rchb.f.
P. decumbens var. *Lobbii* (Rchb.f.) P. F. Hunt	= *P. Lobbii* (Rchb.f.) Sweet
P. delicata Rchb.f.	= *P. intermedia* var. *Portei* Rchb.f.
P. deliciosa Rchb.f.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. Denevei J. J. Smith	= *Paraphalaenopsis Denevei* (J. J. Smith) A. D. Hawkes
P. Denisiana Cogn.	= *P. fuscata* Rchb.f.
P. denticulata Rchb.f.	= *P. pallens* (Lindl.) Rchb.f.
P. Devriesiana Rchb.f.	= *P. cornu-cervi* (Breda) Bl. & Rchb.f.
P. Diezii (Covera) Quisumbing. *Nomen*	= *P. intermedia* var. *Diezii* Covera
P. equestris (Schauer) Rchb.f.	Sect. STAUROGLOTTIS
P. erioglossa Hort. ex Burgeff	= *Nomen*
P. erubescens Burb. *Nomen*	= *P. Aphrodite* Rchb.f.
P. Esmeralda Rchb.f.	= *Doritis pulcherrima* Lindl.
P. Esmeralda Godefroy	= *Doritis pulcherrima* Lindl.

P. fasciata Rchb.f.	Sect. ZEBRINAE: Lueddemannianae
P. fimbriata J. J. Smith	Sect. ZEBRINAE: Lueddemannianae
P. × *flava* Guillaum.	= *P. javanica* × *P. amabilis*
P. Foerstermanii Rchb.f.	= *P. pallens* (Lindl.) Rchb.f.
P. Forbesii Ridl.	Sect. FUSCATAE
P. formosana Miwa	= *P. Aphrodite* Rchb.f.
P. fugax Kraenzlin	= *Sarcochilus pallidus* (Bl.) Rchb.f.
P. fuscata Rchb.f.	Sect. FUSCATAE
P. fuscata var. *hurstleri*	= *P. Kunstleri* Hook.f.
P. × *Gersenii* (Teijs. & Binn.) Rolfe	= *P. violacea* × *P. sumatrana*
P. × *Gertrudeae* Quisumbing	= *P. Schillerana* × *P. equestris*
P. gibbosa Sweet	Section PARISHIANAE
P. gigantea J. J. Smith	Sect. AMBOINENSES
P. gloriosa Rchb.f.	= *P. amabilis* (L.) Blume
P. grandiflora Lindl.	= *P. amabilis* (L.) Blume
P. hainanensis Tang & Wang	= *P. Stobartiana* Rchb.f.
P. × *Harriettae*	= *P. amabilis* × *P. violacea*
P. Hebe Rchb.f.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. hieroglyphica (Rchb.f.) Sweet	Sect. ZEBRINAE: Lueddemannianae
P. Hombronii Finet	= *P. amboinensis* J. J. Smith
P. Imperati Hort.	= *P. speciosa* Rchb.f.
P. × *intermedia* Lindl.	= *P. amabilis* × *P. equestris*
P. javanica J. J. Smith	Sect. AMBOINENSES
P. Kimballiana Gower	= *P. Reichenbachiana* Rchb.f. & Sander
P. Klesperana Mueller. *Nomen*	= Probably a *Doritis sp.*
P. Kunstleri Hook.f.	Sect. FUSCATAE
P. lamelligera Sweet	Sect. POLYCHILOS
P. latisepala Rolfe	= *P. javanica* J. J. Smith
P. Laycocki Henders.	= *Paraphalaenopsis Laycocki* (Henders.) A. D. Hawkes
P. × *leucorrhoda* Rchb.f.	= *P. Aphrodite* × *P. Schillerana*
P. Lindenii Loher	Sect. STAUROGLOTTIS
P. Listeri Berkeley. *Nomen*	= *P. Lobbii* (Rchb.f.) Sweet
P. Lobbii Hort. *Nomen*	= *P.* × *intermedia* Lindl.
P. Lobbii (Rchb.f.) Sweet	Sect. PARISHIANAE
P. Lowii Rchb.f.	Sect. PROBOSCIDIOIDES
P. Lueddemanniana Rchb.f.	Sect. ZEBRINAE: Lueddemannianae
P. luteola Burbidge	= *P. pantherina* Rchb.f.
P. maculata Rchb.f.	Sect. ZEBRINAE: Glabrae
P. Mannii Rchb.f.	Sect. POLYCHILOS
P. Mariae Burbidge	Sect. ZEBRINAE: Hirsutae
P. Mastersii King & Pantl.	= *Doritis sp.*
P. × *maurensis* Guillaum.	= *P. Aphrodite* var. *gloriosa* × *Doritis pulcherrima*
P. Micholitzii Rolfe	Sect. AMBOINENSES
P. modesta J. J. Smith	Sect. ZEBRINAE: Glabrae
P. muscicola Ridl.	= *P. maculata* Rchb.f.
P. mysorensis Saldanha	Sect. PARISHIANAE
P. ochracea E. A. Carriere ex Stein	= *P. Lueddemanniana* var. *ochracea* Rchb.f.
P. pallens (Lindl.) Rchb.f.	Sect. ZEBRINAE: Hirsutae
P. pantherina Rchb.f.	Sect. POLYCHILOS

P. Parishii Rchb.f.	Sect. PARISHIANAE
P. Parishii var. *Lobbii* Rchb.f.	= *P. Lobbii* (Rchb.f.) Sweet
P. pleiobary Hort. ex Burgeff. *Nomen*	= *P. amabilis* (L.) Blume
P. × *Portei* (Rchb.f.) Denning	= *P.* × *intermedia* Lindl.
P. × *Porteri* Hort. *Sphalm.*	= *P.* × *intermedia* Lindl.
P. proboscidioides Parish ex Rchb.f.	= *P. Lowii* Rchb.f.
P. psilantha Schltr.	= *P. amboinensis* J. J. Smith
P. pulcherrima (Lindl.) J. J. Smith	= *Doritis pulcherrima* Lindl.
P. pulchra (Rchb.f.) Sweet	Sect. ZEBRINAE: Lueddemannianae
P. × *punctatissima* Guillaum.	= *P. Stuartiana* × *P. violacea*
P. Regnierana Rchb.f.	= *Doritis Regnierana* (Rchb.f.) Holttum
P. Reichenbachiana Rchb.f. & Sander	Sect. ZEBRINAE: Lueddemannianae
P. Rimestadiana Hort.	= *P. amabilis* (L.) Blume
P. riteiwanensis Masamune	= *P. equestris* (Schauer) Rchb.f.
P. Robinsonii J. J. Smith	Sect. AMBOINENSES
P. rosea Lindl.	= *P. equestris* (Schauer) Rchb.f.
P. Rosenstromii F. M. Bailey	= *P. amabilis* var. *papuana* Schltr.
P. × *Rothschildiana* Rchb.f.	= *P. Schillerana* × *P. Aphrodite*
P. Ruckeri Hort. ex. Rchb.f.	= *Sarcochilus pallidus* (Bl.) Rchb.f.
P. Ruckerana Hort. ex Warn.	= *Sarcochilus pallidus* (Bl.) Rchb.f.
P. Sanderana Rchb.f.	Sect. PHALAENOPSIS
P. Schillerana Rchb.f.	Sect. PHALAENOPSIS
P. × *Sedeni* Rolfe	= *P. amabilis* × *P. Lueddemanniana*
P. serpentilingua J. J. Smith	= *Paraphalaenopsis serpentilingua* (J. J. Smith) A. D. Hawkes
P. Simonsei J. P. Simonse. *Nomen*	= *Paraphalaenopsis serpentilingua* (J. J. Smith) A. D. Hawkes
P. × *singuliflora* J. J. Smith	= *P.* × *Gersenii* (Teijs. & Binn.) Rolfe
P. speciosa Rchb.f.	Sect. ZEBRINAE: Zebrinae
P. Stobartiana Rchb.f.	Sect. APHYLLAE
P. Stuartiana Rchb.f.	Sect. PHALAENOPSIS
P. sumatrana Korth. & Rchb.f.	Sect. ZEBRINAE: Zebrinae
P tetraspis Rchb.f.	= *P. speciosa* var. *tetraspis* (Rchb.f.) Sweet
P. × *Thorntonii* Holttum	= *Paraphalaenopsis Thorntonii* (Holttum) Hawkes
P. × *Valentini* Rchb.f.	= *P. cornu-cervi* × *P. violacea*
P. × *Veitchiana* Rchb.f.	= *P. equestris* × *P. Schillerana*
P. × *Veitchii* Hort.	= *P.* × *Veitchiana* Rchb.f.
P. vestalis Hort.	= *P. Schillerana* var. *vestalis* Rchb.f.
P. violacea Witte	Sect. ZEBRINAE: Lueddemannianae
P. × *Virataii* Quisumbing	= *P.* × *Gertrudae* Quisumbing
P. viridis J. J. Smith	Sect. FUSCATAE
P. × *Wiganiae* Hort.	= *P. Schillerana* × *P. Stuartiana*
P. Wightii Rchb.f.	= *Kingidium deliciosum* (Rchb.f.) Sweet
P. Wightii var. *Stobartiana* (Rchb.f.) Burbidge	= *P. Stobartiana* Rchb.f.
P. Wilsoni Rolfe	Sect. APHYLLAE
P. × *Youngii* Hort.	= *P. Schillerana* × *P. amabilis*
P. × *Youngiana* Hort.	= *P.* × *leucorrhoda* Rchb.f.
P. zebrina Teijs. & Binn	= *P. sumatrana* Korth. & Rchb.f.
P. zebrina Witte	= *P. sumatrana* Korth. & Rchb.f.

PHALAENOPSIS Blume in Bijdragen 7:294, 1825; Sweet in Amer. Orch. Soc. Bull. 37:870, 1968.

Syn.: *Synadena* Raf., Fl. Tellur 4:9, 1838.

Type: *Epidendrum amabile* L. = *Phalaenopsis amabilis* (L.) Blume.

Polychilos Breda in Kuhl & van Hasselt, Gen. et Spec. Orch. 1, 1827.

Polystylus Hass. in Natuurk. Tijdschr. Nederland. Indie 10:3, 1856.

Type: *Polychilos cornu-cervi* Breda = *Phalaenopsis cornu-cervi* (Breda) Blume et Rchb.f.

Stauroglottis Schauer in Nov. Act. Acad. Nat. Cur. 19, suppl. 1, 432, 1843.

Type: *Stauroglottis equestris* Schauer = *Phalenopsis equestris* (Schauer) Rchb.f.

Grafia A. D. Hawkes in Phytologia 13:306, 1966.

Type: *Phalaenopsis Parishii* Rchb.f.

Sepals subequal, free, spreading, occasionally reflexed. Petals similar to sepals or much larger and wider, apex acute to obtuse, occasionally rounded, base clawed or tapered. Lip continuous with column-foot or inserted at a right angle, three-lobed; lateral lobes erect, parallel with column, with cushion-like protuberance in or about the middle; midlobe porrect, fleshy, concave, flat or convex, with or without a central keel, often pulvinate at apex and adorned with various types of hairs, rigidly attached to lateral lobes, seldom mobile; disc between lateral lobes either glabrous or with various callosities or protuberances, at the junction of midlobe and lateral lobes with either a bifid, acicular, callus-like projection or with a semifolded, quadrate, peltate callus. Column erect, cylindric or arcuate, often constricted in middle, commonly without wings, rarely with a proboscis-like projection at apex, basally produced into a short column-foot. Clinandrium commonly shallow, marginate, at times well developed, hood-like, margin either entire or variously erose. Stigma large. Rostellum well developed, bifid. Anther subterminal, operculate, incumbent, 2-locular. Pollinia two, subglobose, cleft, occasionally almost to base, on fairly long thin stipe. Gland prominent, scale-like. Ovary cylindric or clavate, always pedicellate.

Plants epiphytic or lithophytic. Roots adventitious, fleshy, copious, arising from base of stem and from lower nodes; those in aphyllous species chlorophyll-bearing. Stems short, leafy, without pseudobulbs. Leaves approximate, distichous, persistent, occasionally bract-like and deciduous, fleshy, erect, arcuate, or pendent; varying in outline from elliptic to oblong-lanceolate and obovate-lanceolate, usually widest in apical half, narrowing gradually to conduplicate, sheathing base, rarely petiolate, canaliculate above, carinate below. Inflorescence lateral, one- to many-flowered raceme or panicle with either straight or flexuous rachis, rarely becoming fleshy and laterally compressed toward the tip. Bracts small, scarious, shorter than pedicellate ovaries. Flowers small to rather large, long-lasting, delicate in texture, variously colored, sepals and petals of large-flowered species ranging from white to pale pink and mauve, of small-flowered ones from yellow with red-brown markings to deep pink and dark magenta. Lip often more brilliantly colored than other floral segments.

Genus of approximately 40 species occurring in the Himalayas, China, Tibet, Southeast Asia, Formosa, Philippines, Andaman Islands, Sumatra, Java, Borneo, Celebes, New Guinea and northern Australia.

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aa. Column with a non-developed, low, marginate, entire, clinandrium or anther bed.....b

b. Lip between lateral lobes with various adornments other than a single bifid callus.....Subsection **LUEDDEMANNIANAE**

bb. Lip between lateral lobes with a single bifid callus c

c. Midlobe of lip hairy at apex.....Subsection **HIRSUTAE**

cc. Midlobe of lip glabrous throughout ..... Subsection **GLABRAE**

MONOGRAPHIC TREATMENT

Section **PHALAENOPSIS** (Benth. in Journ. Linn. Soc. 18: 332, 1881); Sweet in Amer. Orch. Soc. Bull. 37:872, 1968; *ibid.* 38:681, 1969.

Syn.: Sect. *Euphalaenopsis* Benth. in Benth. & Hooker, Gen. Pl. 3:573, 1883. Genus *Synadena* Raf. Fl. Tellur. 4:9, 1838.

Petals much broader than sepals, roundish in outline, the upper edge more curved than the lower one and base much constricted; lip with a pair of antenna-like appendages at apex, sometimes reduced to a pair of short teeth; column with a short rostellum.

Type: *Epidendrum amabile* L. = *Phalaenopsis amabilis* (L.) Blume.

Observations: In view of the great similarity that exists among the species which constitute this section, it seems advisable to call attention to the differences in the morphology of the calli. Throughout the whole revision the importance of this criterion has been emphasized as a diagnostic feature for the species in the genus *Phalaenopsis*. For convenience, front and side views of the callus of each species in this section are shown side by side. **Figure a,** *P. amabilis* is readily identifiable by the simple entire callus. **Figure b,** *P. Aphrodite* has for its outstanding characteristic the median finger-like prominence which originates dorsally and extends beyond the shallow emarginate apex of the callus. **Figure c,** *P. Sanderana* shows a distinctly horseshoe-shaped callus with a frontal tooth on both sides. **Figure d,** *P. Stuartiana* shows a broad V-shaped callus with divergent horn-like extensions at the apex and an acute or obtuse base. **Figure e,** *P. Schillerana* is characterized by a quadrate callus without a prominent horn-like extension at the apex and with a distinct truncate or emarginate base.

KEY TO THE SPECIES

1. Upper surface of MATURE leaves unicolored without maculations 2

1a. Upper surface of MATURE leaves green with silvery or grayish maculations 8

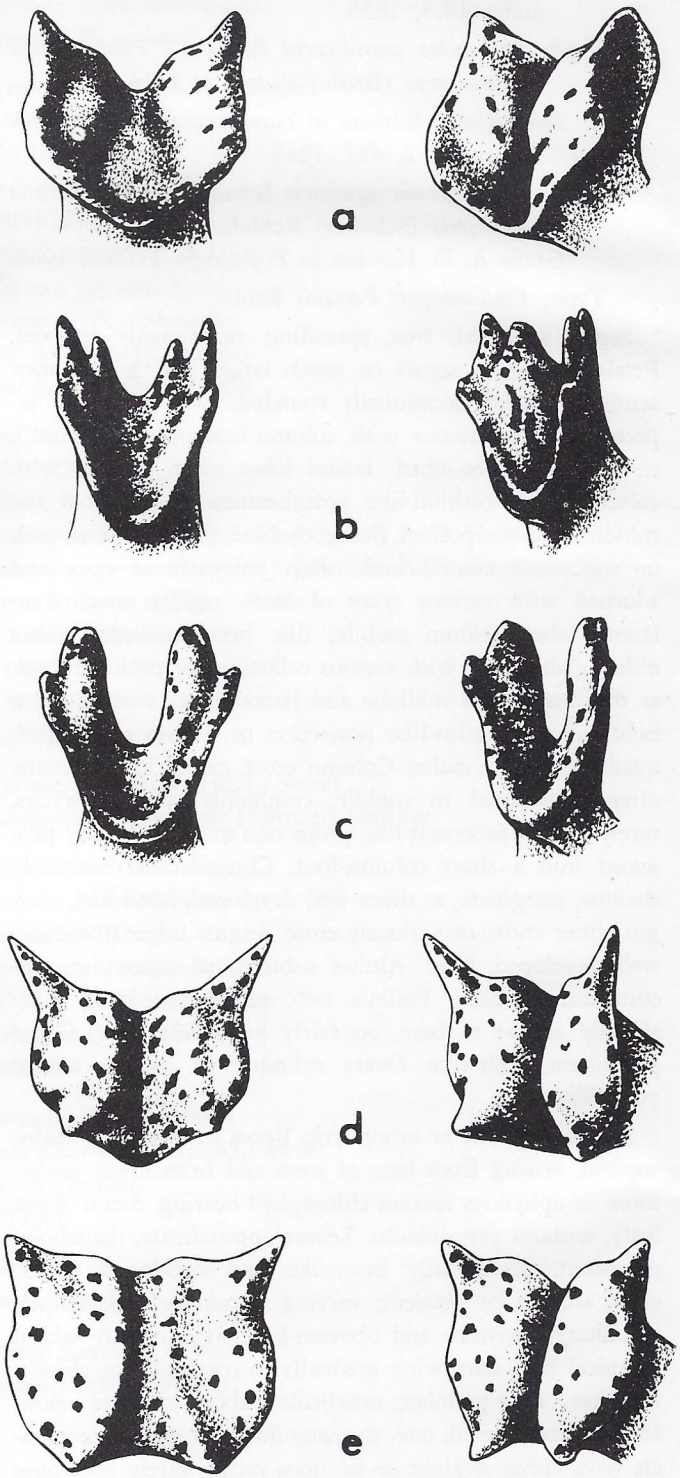
2. Peduncle and rachis green; midlobe of lip cruciform or linear-oblong .....**P. amabilis**

2a. Peduncle and rachis purplish; midlobe of lip otherwise 3

3. Midlobe of lip sagittate-hastate 4

3a. Midlobe of lip obovate 6

4. YOUNG leaves green above, purplish below; midlobe of lip broadly triangular, acute; callus emarginate, dorsally provided with a finger-like extension .....**P. Aphrodite**



Calli on lips, front and side views, of Section Phalaenopsis. Modified from Quisumbing. a. *Phalaenopsis amabilis*. b. *P. Aphrodite*. c. *P. Sanderana*. d. *P. Stuartiana*. e. *P. Schillerana*.

4a. YOUNG leaves with silvery or grayish maculations above, disappearing with age 5

5. Midlobe of lip with narrowly triangular side laciniae; callus horseshoe-shaped.....**P. Sanderana**

5a. Midlobe of lip without side laciniae; callus didymous, denticulate .....**P. leucorrhoda**

6. Young leaves green above, purplish below .....**P. intermedia**

6a. Young leaves with silvery or grayish maculations above, disappearing with age 7

7. Midlobe of lip bidentate or bicuspidate .....**P. Veitchiana**

7a. Midlobe of lip anchor-shape or bicirrhous .....**P. leucorrhoda**

8. Flowers pale purple; callus quadrate with a truncate or emarginate base.....**P. Schillerana**

8a. Flowers white; callus broadly V-shaped with divergent horn-like extensions and an obtuse base .....**P. Stuartiana**

Enumeration of Species

Phalaenopsis amabilis (L.) Blume in Bijdr. 7:294, 1825; Sweet in Amer. Orch. Soc. Bull. 38:863, 1969.

Basionym: *Epidendrum amabile* Linnaeus, Sp. Pl. 953, 1753.

Syn.: *Cymbidium amabile* (L.) Roxb., Hort. Beng. 63: 1814; Fl. Ind. 2:457, 1832.

Synadena amabilis (L.) Raf., Fl. Tellur. 4:9, 1838.

Type: Java. Without precise locality. Coll. Osbeck s.n.! (LINN).

Phalaenopsis grandiflora Lindl. in Gard. Chron. 39, 1848.

Phalaenopsis amabilis var. *grandiflora* (Lindl.) Batem., Second Cent. Orch. Pl., t. 114, 1867.

Type: Java. Coll. unknown. Cult. Veitch s.n.! (K).

Phalaenopsis grandiflora var. *gracillima* Burb. in The Garden 22:118, 1882.

Type: Palawan Island. Without precise locality. Coll. Burbidge s.n.! (BM).

Phalaenopsis gloriosa Rchb.f. in Gard. Chron. ser. 3, 3:554, 1888.

Phalaenopsis Aphrodite var. *gloriosa* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:25, 1891.

Phalaenopsis amabilis var. *Aphrodite* subvar. *gloriosa* (Rchb.f.) Ames, Orch. 2:227, 1908.

Type: Origin unknown. Cult. Low s.n.! (W).

Phalaenopsis amabilis var. *Fournieri* Cogn. in Chron. Orchid. 166, 1898.

Type: Origin unknown. Cult. Regnier s.n.

Phalaenopsis amabilis var. *Rimestädiana* Linden in Lindenia 16:35, t. 736, 1901.

Phalaenopsis Rimestadiana (Linden) Rolfe in Orch. Rev. 13:260, 1905.

Type: Origin unknown. Lindenia 16:35, t. 736, 1901.

Phalaenopsis amabilis var. *Rimestadiana alba* Hort. in Orchis 1:27, t. 4, 1906 (as var. *Rimestadtiana alba* Hort.).

Phalaenopsis amabilis var. *ramosa* van Deventer in Orchideeën 1:94, figs. 1 and 2, 1935.

Type: Java. Without precise locality. Cult. van Deventer.

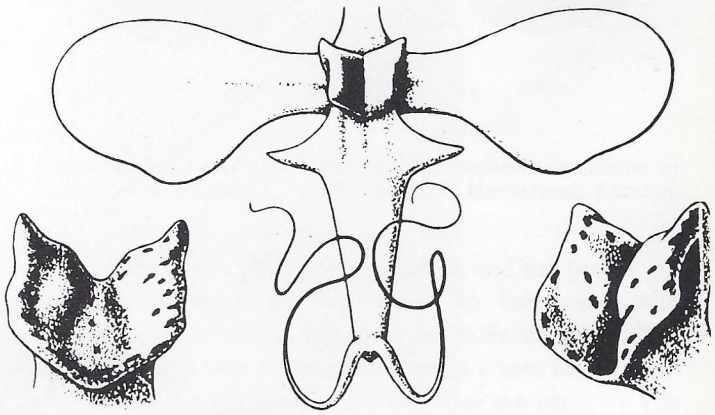
Phalaenopsis amabilis var. "Gloriosa" (Pleihari) van Brero in De Orchidee 6:46, 1937. *Nomen illegit.*

Type: S.E. Borneo. Cult. van Brero.

Phalaenopsis pleihary Burgeff in Cat. Bot. Garden, Wuerzburg, 1968. *Nomen.*

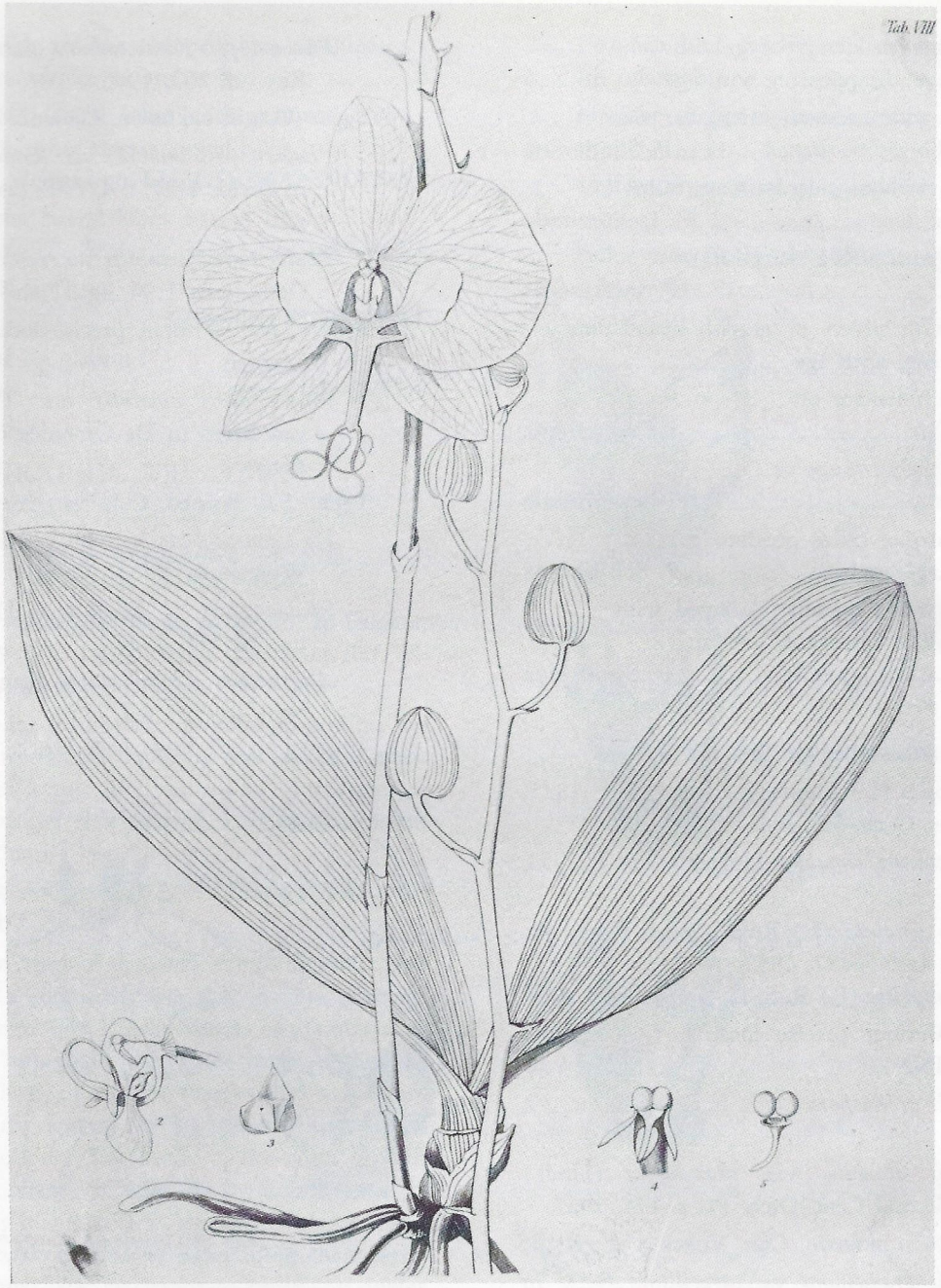
Phalaenopsis × *Elisabethae* Hort. in Rev. Hort. n.s. 20:534, 1927.

Angraecum album majus Rumphius, Herb. Amboin. 6:99, t. 43, 1750.



Lip and callus of *P. amabilis*.

Epiphytic, quite variable, usually robust, pendent; roots extensive, fleshy, often branched, flexuous, glabrous; stem short, robust, rhizome-like, completely enclosed by imbricating leaf-sheaths, as well as by the many adventitious roots; leaves fleshy or leathery, few up to 5, rarely more, arcuate or pendent, shiny above, unicolored, elliptic, ovate-elliptic to obovate or oblong-oblanceolate, most commonly tapering toward base, rarely provided with short conduplicate petiole, apex obtuse, rarely acute, at times rounded, up to 50 cm. long and 10 cm. wide; inflorescence usually slender, occasionally robust, racemose or with 1 to several flexuous branches, hence paniculate, commonly laxly- from few- to many-flowered, not rarely a meter or more long; bracts rather inconspicuous, scarious, triangular-cucullate, up to 5 mm. long, much shorter than pedicellate ovaries; flowers quite variable in size in wild specimens, rather delicate in texture, showy, long-lasting, fragrant, with anthesis starting



Phalaenopsis amabilis **(L.) Blume, type species of the genus. Reproduced from Bennett, J. J., and R. Brown, Plantae Javanicae Rariores, t. 8, 1838. The text of this plate states that this drawing has been compared with the type specimen of *Epidendrum amabile* L. by Robert Brown.**

at base of inflorescence; dorsal sepal erect, elliptic or elliptic-ovate; occasionally short-clawed, obtuse, up to 4 cm. long and 2.5 cm. wide; lateral sepals ovate, ovate-elliptic or ovate-lanceolate, somewhat oblique, acute, rarely subacuminate, up to 4 cm. long and 2.5 cm. wide; petals much larger and broader than sepals, unequally subrotund, transverse-elliptic or subreniform in outline, distinctly rounded above, below contracted into a cuneate, subpetiolate base, up to 4.5 cm. long and 5.0 cm. wide; lip fleshier than the other flower segments, distinctly long unguiculate, 3-lobed; lateral lobes erect, obovate-oblanceolate, rounded above, laterally emarginate below apex, up to 21 mm. long and 13 mm. wide; midlobe from a cuneate base, cruciform; lateral laciniae narrowly triangular, acute, midlacinia linear-oblong, slightly narrowing toward apex which terminates in two elongate, filiform, sinuous, tendril-like cirrhi; whole lip up to 23 mm. long excluding cirrhi and 22 mm. across lateral laciniae; at junction of midlobe and lateral lobes a fleshy conduplicate subquadrate, peltate callus with entire margins; column short, cylindric, about as long as claw of lip; pedicellate ovaries up to 5 cm. long.

Distribution: Queensland (Australia), New Guinea, Seram, Moluccas, Ambon, Buru, Timor, Ke Island, Celebes, Java, Borneo, Mentawei Islands (Sumatra), Lambugan Island, Sulu, Tawi Tawi, Balabac Islands, Bancalan Islands and Palawan Island in the Philippines.

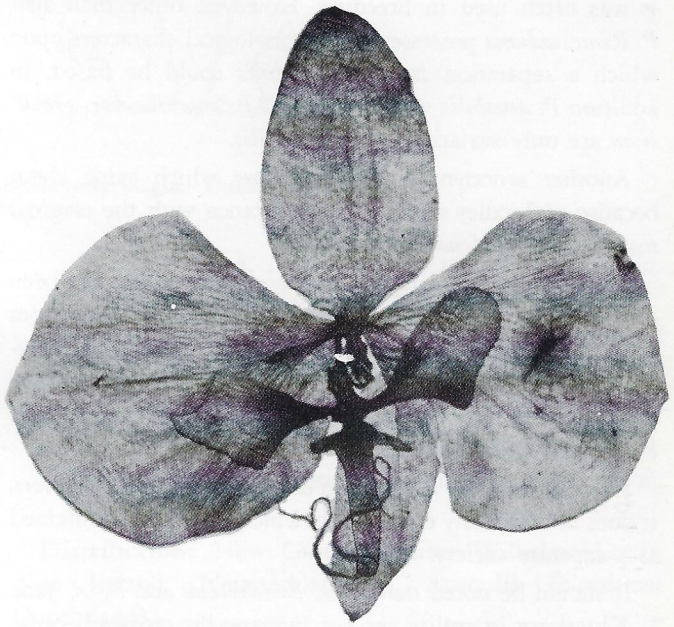
SUNDA ISLANDS: Cult. Jenisch s.n.! (NY); Pulau Panatain, w. of Tg. Parat. Coll. van Borssum Walkes 763! (L). JAVA: Without precise locality. Coll. Osbeck s.n.! (LINN, UPSV); Coll. Horsfield 262! (BM); Coll. Lahaie 2415! (P); Cult. Veitch s.n.! (K). Prov. Bantam. Coll. Blume s.n.! (L,P) Prov. Maliang, Tenge. Collector unknown, 531! (W). Prov. Preanger, Pendjaln. Coll. Koorders & Schimm 444466! (L); Palaboean Ratoe. Coll. Palmer & Bryant 1275! (US); Palabaeau. Jansen s.n. (C); Tjisalah. Coll. Backhuizen 3177! (L). Prov. Rogodjampi. Coll. Zollinger 531! (BM,P,W); Salek. Coll. Hockreutiner 205! (Z); Coll. Dantu s.n.! (L); Tjikanse. Coll. Kuntze 4954! (NY). TIMOR ISLAND. Coll. Riedel s.n.! (K). BORNEO. Without locality. Coll. Barber s.n.! (W). SARAWAK. Ambon. Coll. Doleschall 366! (W), II, 172! (W); Coll. Kegel s.n.! (W); Coll. Robinson 8 (L); Coll. Maingay 3154 (K), 1643 (K). Banggi. Coll. Fraser 228! (K); Kiau. Coll. Carr 27026 (AMES); Tenompok. Coll. Clemens 28617! (AMES,K,L,NY); Ternon District. Coll. Gibbs 2704! (BM,K,US); Penibukan, Mt. Kinabalu. Coll. Clemens 31626! (BM). PALAWAN ISLAND. Penigisan. Coll. Olsen 353 (C); without precise locality. Coll. Burbidge s.n.! (BM); Coll. Escritor 21586! (AMES,US); Brooks Point. Coll. Elmer 12614! (AMES); Taytay. Coll. Merrill 9174! (AMES). BANCALAN ISLAND. Coll. Weber 4! (AMES). LUMBUCAN ISLAND. Coll. Merrill 7188! (AMES,L,US). CELEBES. Minahasa. Coll. Forman 338! (K); Coll. Koorders 29512! (K). NEW GUINEA. Lae. Coll. Garay 626! (AMES). ORIGIN UNKNOWN. Cult. Low s.n.! (W). Also living flowers have been studied.

Illustrations: Rumphia 4: t. 194, fig. 1; t. 199a, 1849; Blume, Tabellen Pl. Javaan. Orch. t. 43, 1825; Bennett & Brown, Pl. Jav. Rar. t. 8, 1838; Bot. Mag. 86: t. 5184, 1860.

Observation: This species is very variable in the color of the flowers. The sepals and petals are usually milky white on the upper surface and tend to have a pinkish suffusion on the dorsal surface, particularly at the bases of the sepals and petals. The lip is white, but the margins of the lateral lobes and midlobe opposite one another are colored a rich golden yellow or brownish yellow; the callus is deeper golden yellow densely spotted with crimson and there are crimson lines appearing sparsely at the base of the lateral lobes; the tips of the cirrhi are also a golden yellow.

Phalaenopsis amabilis is the species upon which Blume founded the genus. Originally it was described in 1753 by Linnaeus as *Epidendrum amabile,* in his first edition of his Species Plantarum, based on specimens collected by Peter Osbeck on his way from China to England when his ship stopped at the western end of Java on New Island for water in 1752. He preserved the material and ultimately sent it to Linnaeus. These specimens which I have studied and photographed in the Linnean Herbarium in London are still remarkably well preserved and clearly show the characters by which this species is recognized.

Osbeck, in A Voyage to China and the East Indies, English edit., vol. 2, pp. 46 and 50, 1771, gives the following account: "The 19th of January (1752). After a fortnight's voyage from the Landrones, we anchored about noon in the Newbay, the usual harbour; and we took as much water from Java as would suffice for the whole voyage. In the afternoon I went in a boat on shore near the place whence we took in water. It is difficult to reach the shore, because the ground is so full of corals that we were obliged



***Phalaenopsis amabilis* (L.) Blume. The holotype specimen of *Epidendrum amabile* L. in the Linnean Herbarium, London, England.**

to leave the boat a good way behind us, and the people got out and waded up to their breasts in water, and with difficulty carried me to the shore on their shoulders. The country here is very high and the water comes hither from the fens in the woods runs roaring into the sea. . . . The forest was so close that we passed through with great difficulty; and the cries of the birds, and the lizards, and other noises, would not permit us to call to each other. In some places it was so wet, that I followed my companions with reluctance, for it rained about this time every night and forenoon, and sometimes all the day long. The excessive high but slender trees, make the forest dark; . . .

"Epidendrum amabile grew on the branches of trees on the shore. The plant hath great odoriferous flowers, such as I never observed before. I had this plant lying in my room for some days together; but the flowers did not wither, and filled it with the most agreeable smell. On the Isle of Ternate none but the princesses are allowed to wear this precious flower, which is but too scarce."

Phalaenopsis amabilis was first flowered in cultivation in England in September 1850, in the collection of J. H. Schroeder of Stratford Green (Rolfe in Orch. Rev. 28:17-18, 1920). At that time it received a Silver Banksian Medal from the Royal Horticultural Society.

Some of these supposedly different species whose names periodically appear in the literature are nothing more than mere synonyms of *P. amabilis.*

One of these names, *P. Rimestadiana* (*P. amabilis* var. *Rimestadiana*), repeatedly mentioned as a parent in Sander's List of Orchid Hybrids, is only a large-flowered horticultural form of *P. amabilis,* which first appeared in the Linden establishment at the turn of the century. Because of its size it was often used in breeding. However, other than size, *P. Rimestadiana* possesses no morphological characters upon which a separation from *P. amabilis* could be based. In addition *P. amabilis* var. *ramosa* and *P. amabilis* var. *gracillima* are only variations of *P. amabilis.*

Another synonym is *P. grandiflora* which came about because of Lindley's lack of acquaintance with the original material of *Epidendrum amabile.*

Phalaenopsis gloriosa is another species which has been confused with *P. amabilis.* The actual confusion stems from a colored illustration published under the name of *P. gloriosa* in The Garden 35:362, t. 697, 1889. That illustration, however, represents *P. Aphrodite.* The type specimen of *P. gloriosa* is inseparable from *P. amabilis.*

Judging from the description of *P. amabilis* var. *Fournieri,* it does not offer any criterion by which it can be maintained as a separate variety.

It should be noted that *P.* × *Elisabethae* and *P.* × Jane L. Kingsbury in reality are not interspecific crosses because the parents are *P. amabilis* var. *Rimestadiana* and *P. amabilis.* Hence, these two so-called hybrids are merely synonyms of *P. amabilis.*

Phalaenopsis amabilis is widely distributed as a glance at the map readily indicates. Because of the extent of the area, consisting of a number of disconnected islands, it is expected that this species will show certain recognizable variations, to some of which distinct varietal names have been attached.

When Linnaeus described *Epidendrum amabile,* he did not know of an earlier publication by Rumphius in which the same species from the Island of Amboina was described and illustrated under the polynomial *Angraecum album majus* in his Herbarium Amboinense 6:99, t. 43, 1750, three years prior to Linnaeus' *Epidendrum amabile.* Therefore, Rumphius polynomial and illustration do not enter into the typification of *Phalaenopsis amabilis* and are merely referable to the Linnean species, *P. amabilis.*

Most probably there will always be questions in the minds of some as to whether *Phalaenopsis amabilis* and *P. Aphrodite* should be kept as separate species or united into one. Both species have been in demand for breeding purposes because of their large white flowers. Each species has an interesting history in addition to their being mutually exclusive in geographical distribution.

The original confusion goes back to Lindley who misidentified a collection from the Philippine Islands with the Linnaean species. Even a casual glance at the illustration of *Phalaenopsis amabilis* and *P. Aphrodite* should convince one of their distinctiveness. The salient features or distinguishing characteristics of *P. amabilis* are the cruciform or cross-shaped midlobe of the lip with narrowly triangular lateral laciniae and with two elongate, filiform, sinuous, tendril-like extensions at its apex which are yellow at tips. The callus is fleshy, sharply angular and quadrate in outline; its color is a deep golden-yellow spotted with crimson. This coloration is extended into the base of the lateral lobes of the lip.

The variation pattern of *P. amabilis* does not include a rhombic-shaped lip. Moreover, as was stated above, the calli of these two species are so different that their union even at a varietal level is not possible.

The following varieties are recognized:

Phalaenopsis amabilis var. **aurea** (Hort.) Rolfe in Gard. Chron. n.s. 26:212, 1886; Sweet in Amer. Orch. Soc. Bull. 38:686, 1969.

Basionym: *Phalaenopsis grandiflora* var. *aurea* Hort. in Proc. Roy. Hort. Soc. 4:135, 1864.

Neotype: Borneo. Cult. Warner s.n., Sel. Orch. Pl., ser. 2, t. 7, 1869. No type specimen of this variety has been preserved, therefore, the color plate by Warner has been designated as the neotype (Sweet in Amer. Orch. Soc. Bull. 38:686, 1969).

Syn.: *Phalaenopsis amabilis* var. *fuscata* Rchb.f. in Bot. Zeit. 20:214, 1862.

Phalaenopsis grandiflora var. *fuscata* (Rchb.f.) Burb. in The Garden 22:118, 1882.

Type: Borneo. Cult. Low n.s.! (W).

Phalaenopsis grandiflora var. *Ruckeri* Burb. in The Garden 9:314, 1876, *nomen nudum.*

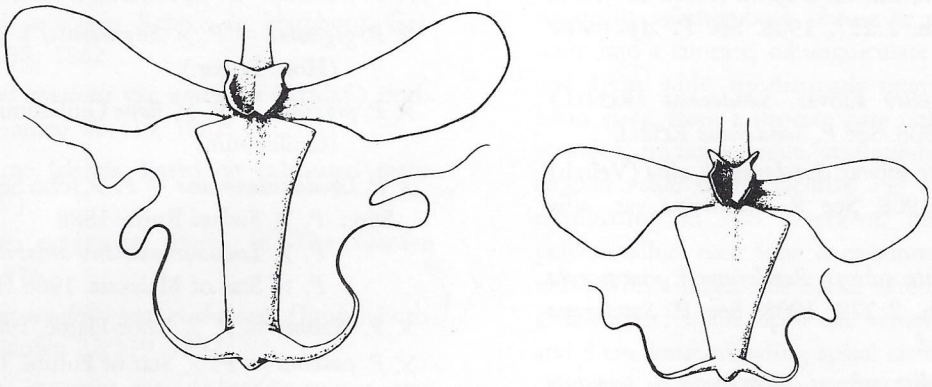
Distribution: Borneo.

BORNEO. Cult. Bull. s.n.! (W); cult. Roebelen s.n.! (W); cult. Low s.n.! (W).

Illustration: Warner, Sel. Orch. Pl., ser. 2, t. 7, 1869.

Observations: In the original description it is stated, "This variety differed from the usual form in having the white front part of the lip a decided yellow colour — not merely tinted here and there, as frequently occurs." This variety is recognized here because of its widespread use in horticulture in hybridizing due to the prominent yellow coloration on the midlobe of the lip. Botanically it does not have any morphological differences to separate it from *P. amabilis. Phalaenopsis amabilis* var. *fuscata* has a more intensely colored lip.

Burbidge in a letter to Rolfe dated August 7, 1886, stated that var. *aurea* ". . . is found on the Tambelan Islands and on Pula Tiga off the Bornean S.E. and N.W. coast respectively and has pale cream flower stems and broadly imbricate perianth."



Left: Outline of lip of *P. amabilis* var. *moluccana.* Right: Outline of lip of *P. amabilis* var. *papuana.* Drawn from types.

Phalaenopsis amabilis var. **moluccana** Schltr. in Fedde, Rep. 10:193, 1911; Sweet in Amer. Orch. Soc. Bull. 38:686, 1969.

Lectotype: Celebes. Gunong Klabat (Minahassa). Coll. Schlechter 20581! (AMES).

Syn.: *Phalaenopsis amabilis* var. *cinerascens* J. J. Smith in Bull. Jard. Bot. Buit. ser. 2, no. 25:88, 1917.

Type: Celebes. Kolaka. Coll. Elbert s.n. Cult. Hort. Bogor. sub. no. 15.

Phalaenopsis celebica van Vloten in Die Orchidee 1:125, 1932.

Type: Celebes. Without precise locality. Cult. van Vloten s.n.

Distribution: Molucca Islands: Seram, Buru, North Celebes, Southeast Celebes (Muna Island).

TAMBELAN ISLAND. Without collector's name, 758! (W). CELEBES. Gunong Klabat. Coll. Schlechter 20581! (AMES); Gorontolo. Coll. Riedel s.n. (K,W); Muna Island, Raha. Coll. Elbert 2867! (L); Bolaang Mongondou. Coll. Kaudern 126! (AMES,L). BURU. Coll. Riedel s.n.! (K,W); Coll. DeVries & Teijsmann s.n.! (L). SERAM. Eiland Boana. Coll. Kornassi 1319! (L). Selewan. Coll. Rutten 2023! (L).

Observations: This variety is easily recognized by the shape of the midlobe of the lip which, instead of being cruciform, is merely linear-oblong with a very slight dilation toward the base. The lateral laciniae so prominent in the species are in this variety either absent or merely suggested.

Phalaenopsis amabilis var. *cinerascens* differs supposedly from other specimens collected in the Celebes in having a grayish color on the upper surface of the leaves. *Phalaenopsis celebica* likewise does not offer any morphological distinction from *P. amabilis* var. *moluccana.*

Phalaenopsis amabilis var. **papuana** Schltr. in Fedde, Rep. Beih. 1:968, 1913; Sweet in Amer. Orch. Soc. Bull. 38:687, 1969.

Lectotype: British New Guinea, Kaiser Wilhelms Land, Malia, at foot of Bismarck Mountains. Coll. Schlechter 18409! (AMES).

Syn.: *Phalaenopsis Rosenstromii* Bail. in Queensland Agric. Journ. 17:231, 1906.

Phalaenopsis amabilis var. *Rosenstromii* (Bail.) Nicholls in Austral. Orch. Rev. 14:104, 1949.

Type: Australia. Queensland, Daintree River. Coll. Rosenstrom s.n.! (K).

Distribution: New Guinea (Kaiser Wilhelms Land), New Ireland (Neumecklenburg), Australia (Northeast Queensland).

BRITISH NEW GUINEA. Malia. Coll. Schlechter 18409! (AMES,K,L); Jaduna. Coll. Schlechter 19308! (AMES,K,L); Kebar, Iboeanari Village. Coll. Mangold s.n.! (L). AUSTRALIA. Queensland, Daintree River. Coll. Rosenstrom s.n.! (K). Also living cultivated flowers from plants collected in the wild have been studied.

Illustration: Fedde, Rep. Beih. 21: t. 341, no. 1317, 1923.

Observations: This variety differs from the species and from *P. amabilis* var. *moluccana* in having a lip with a narrowly triangular midlobe.

Phalaenopsis Rosenstromii, of which I have studied the type material at Kew, England, and also living material from Queensland, Australia, through the courtesy of Mr. Cliff Bunn, is in no way separable from *P. amabilis* var. *papuana.*

While the midlobe of the lip of *P. amabilis* var. *papuana* approximates that of *P. Aphrodite,* the two can be separated easily by the structure of the callus, the position of the lateral lobes of the lip, and differences in color.

Excluded Varieties

P. amabilis var. *ambigua* (Rchb.f.) Burbidge in The Garden 22:119, 1882. See *P. Aphrodite* Rchb.f.

P. amabilis var. *Aphrodite* (Rchb.f.) Ames, Orch. 2:226, 1908. See *P. Aphrodite* Rchb.f.

P. amabilis var. *Aphrodite* subvar. *erubescens* (Burb.) Ames, Orch. 2:227, 1908. See *P. Aphrodite* Rchb.f.

P. amabilis var. *Aphrodite* subvar. *Dayana* (Hort. ex Warn. & Wms.) Ames, Orch. 2:227, 1908. See *P. Aphrodite* Rchb.f.

P. amabilis var. *Aphrodite* subvar. *Sanderana* (Rchb.f.) Ames, Orch. 2:228, 1908. See *P. Sanderana* Rchb.f.

P. amabilis var. *Aphrodite* subvar. *Sanderana* f. *alba* (Veitch) Ames, Orch. 2:228, 1908. See *P. Sanderana* var. *alba* (Veitch) Stein.

P. amabilis var. *Aphrodite* subvar. *Sanderana* f. *marmorata* (Rchb.f.) Ames, Orch. 2:228, 1908. See *P. Sanderana* var. *marmorata* Rchb.f.

P. amabilis var. *Aphrodite* subvar. *Sanderana* f. *punctata* (O'Brien) Ames, Orch. 2:229, 1908. See *P. Sanderana* var. *punctata* O'Brien.

P. amabilis var. *Dayana* Hort. ex Warn. & Wms., Orch. Album 1: t. 11, 1881. See *P. Aphrodite* Rchb.f.

P. amabilis var. *erubescens* (Burb.) Burbidge in The Garden 22:119, 1882. See *P. Aphrodite* Rchb.f.

P. amabilis var. *formosa* Shimadzu in Orch. Rev. 29:68, 1921. See *P. Aphrodite* Rchb.f.

P. amabilis var. *longifolia* Don, Hort. Cantabrig. ed. 13, 608, 1845. See *P. Aphrodite* Rchb.f.

P. amabilis var. *rotundifolia* Don, Hort. Cantabrig. ed. 13, 608, 1845. See *P. Aphrodite* Rchb.f.

P. grandiflora var. *borneënsis* Hort. ex E. Corning, Cat. of Orch. 29, 1881. *Nomen.*

P. amabilis var. *Sanderana* Davis in Amer. Orch. Soc. Bull. 18:744, 1949. *Nomen.* See *P. Sanderana* Rchb.f.

PRIMARY CROSSES

Phalaenopsis amabilis (L.) Blume*

Syn.: *P.* × *Elisabethae* Hort. 1927
P. × Jane L. Kingsbury. 1939 (Pierson)

× *P. amboinensis* = *P.* × *Deventerana.* 1927 (van Deventer)
Syn.: *P.* × Sphaira. 1968 (Burgeff)
P. × Harmony of Spheres. 1968 (Burgeff)

× *P. Aphrodite* = *P.* × Gilles Gratiot. 1920 (Gratiot)
Syn.: *P.* × Harmony. 1935 (Armacost & Royston)
P. × Bataan. 1943 (Rapella)

× *P. cornu-cervi* = *P.* × Little Star. 1962 (Ceyon Bot. Gdns.)
Syn.: *P.* × Bambi. 1968 (Burgeff)
P. × Children's Starlet. 1968 (Burgeff)

× *P. equestris* = *P.* × Artemis. 1892 (Veitch)
Syn.: *P.* × Younes Resal. 1919 (Gratiot)
P. × Roselle. 1942 (Atherton)

× *P. fuscata* = *P.* × *Fuscatilis.* 1968 (Minne)

× *P. gigantea* = *P.* × *bogoriensis* J. J. Smith. 1936 (Hort. Bogor.)

× *P. javanica* = *P.* × *flava* Guillaumin. 1923 (Guillaumin)

× *P. Lueddemanniana* = *P.* × John Seden. 1888 (Veitch)
Syn.: *P.* × *Sedeni* Rolfe. 1888
P. × *Lueddemanniano-amabilis.* 1888
P. × Star of Malaysia. 1968 (Burgeff)

× *P. Mannii* = *P.* × Thor-Flame. 1963 (Thornton)

× *P. pulchra* = *P.* × Star of Future. 1968 (Burgeff)
P. × K. D. Morgenstern. 1968 (Burgeff)

× *P. Sanderana* = *P.* × Rimesand. 1923 (Guillaumin)
Syn.: *P.* × Yoshino. 1924 (Iwasaki)
P. × Versailles. 1929 (Vacherot & Lecoufle)
P. × Alger. 1930 (Vacherot & Lecoufle)
P. × La Purissima. 1940 (Armacost & Royston)

× *P. Schillerana* = *P.* × Confirmation. 1925 (Bultel)
Syn.: *P.* × Cherubin. 1935 (Vacherot & Lecoufle)

× *P. Stuartiana* = *P.* × Leda Rolfe. 1888 (Veitch)
Syn.: *P.* × A. Benick. 1933 (Wolter)

× *P. sumatrana* = *P.* × *Sumabilis.* 1938 (Atherton)
Syn.: *P.* × Star of Sumatra. 1968 (Burgeff)

× *P. violacea* = *P.* × *Harriettae* Rolfe. 1887 (Veitch)
Syn.: *P.* × Anak Bulan Holttum. 1935
P. × Violetta. 1968 (Burgeff)

× *Renanthera coccinea* = × *Renanthopsis* Thillai Ammah. 1965 (McCoy)

× *Renanthera monachica* = × *Renanthopsis* Golden Dew Drops. 1965 (McCoy)

× *Renanthera Storiei* = × *Renanthopsis* Native Dancer. 1965 (McCoy)

× *Vanda coerulea* = × *Vandaenopsis* Blue Horizon. 1962 (de Saram)

× *Vanda suavis* = × *Vandaenopsis ferrierensis.* 1931 (Chassaing)

Phalaenopsis Aphrodite Rchb.f. in Hamburg. Gartenz. 18:35, 1862; Sweet in Amer. Orch. Soc. Bull. 38:689-694, 1969.

Syn.: *Phalaenopsis amabilis* Lindl. in Bot. Reg. 24: t. 34, 1838, not Blume 1825.

Phalaenopsis amabilis var. *Aphrodite* (Rchb.f.) Ames, Orch. 2:226, 1908.

Type: Philippine Islands. Luzon, Manila. Coll. Cuming 2092! (W).

Phalaenopsis amabilis var. *longifolia* Don, Hort. Cantabrig. ed. 13, 608, 1845.

Type: Philippine Islands. Manila. Coll. unknown.

Phalaenopsis amabilis var. *rotundifolia* Don, Hort. Cantabrig. ed. 13, 608, 1845.

*The following list pertains to all names reported in the literature as interpreted by taxonomy. It is not possible always to determine what the actual species was that the hybridizer had at hand when he used the binomial, *Phalaenopsis amabilis.*

Type: Philippine Islands. Manila. Coll. unknown.

Phalaenopsis ambigua Rchb.f. in Hamburg. Gartenz. 18:35, 1862.

Phalaenopsis amabilis var. *ambigua* (Rchb.f.) Burb. in The Garden 22:119, 1882.

Type: Philippine Islands. Based on cultivated material! (W).

Phalaenopsis erubescens Burb. in The Garden 9:314, 1876.

Phalaenopsis amabilis var. *erubescens* (Burb.) Burb. in The Garden 22:119, 1882.

Phalaenopsis amabilis var. *Aphrodite* subvar. *erubescens* (Burb.) Ames, Orch. 2:227, 1908.

Type: Philippine Islands. No material is known to exist.

Phalaenopsis amabilis var. *Dayana* Hort. ex Warner & Wms., Orch. Album 1: t. 11, 1881.

Phalaenopsis Aphrodite var. *Dayana* (Hort. ex Warner & Wms.) Veitch, Man. Orch. Pl. pt. 7:24, 1891.

Phalaenopsis amabilis var. *Aphrodite* subvar *Dayana* (Hort. ex Warner & Wms.) Ames, Orch. 2:227, 1908.

Type: Philippine Islands. Cult. Hort. Day! Dec. 1880. (W).

Phalaenopsis formosana Miwa in Pract. Hort. (Jissai Engei, Tokyo) 27:115, fig., 1941. *Nomen illegit.*

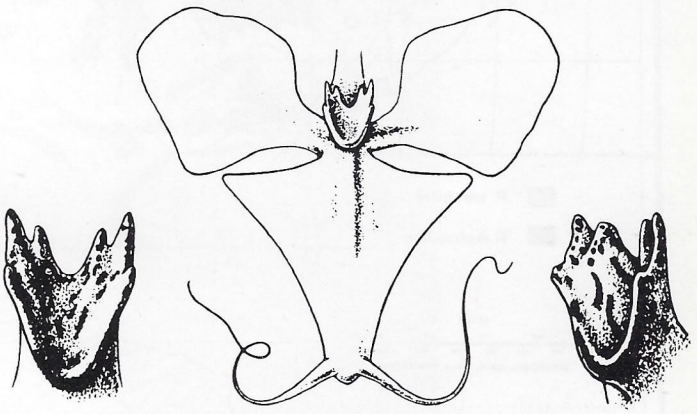
Phalaenopsis Babuyana Miwa in Pract. Hort. (Jissai Engei, Tokyo) 27:117, fig., 1941. *Nomen illegit.*

Phalaenopsis formosum Hort. ex Sander's One-Table List of Orchid Hybrids 2:862, 1961. *Nomen.*

Phalaenopsis amabilis var. *formosa* Shimadzu in Orch. Rev. 29:68, 1921. *Nomen.*

Visco-Aloes Luzonis decima quarta Kamel in Ray, Historia Plantarum. 3: Appendix p. 34, 1704.

Epiphytic, pendent; roots abundant, fleshy with purplish tips, flexuous, glabrous; stem short, occasionally rhizome-like, completely enclosed by imbricating leaf-bases; leaves fleshy, green above, purplish below, elliptic or oblong-elliptic, oblong-ovate to oblong-oblanceolate, acute or obtuse, rarely rounded, gradually tapering to conduplicate sheaths, up to 25 cm. long and 6 cm. wide; inflorescence arcuate or pendent, purple, much surpassing the leaves, racemose or occasionally with a few branches, commonly loosely many-flowered on a fractiflex rachis; anthesis proceeding from base toward tip; bracts broadly triangular, cucullate, up to 5 mm. long; flowers rather delicate in texture, showy; dorsal sepal elliptic or ovate-elliptic, obtuse or rounded, sessile, up to 4 cm. long and 2 cm. wide; lateral sepals obliquely ovate, acute or obtuse, up to 4 cm. long and 2 cm. wide; petals unequally subrhomboid, obtuse or rounded, tapering gradually into a cuneate, subunguiculate base, up to 4 cm. long and 4 cm. wide; lip distinctly unguiculate, 3-lobed; lateral lobes erect, from a cuneate base obliquely ovate, obtuse or rounded; midlobe sessile, sagittate-hastate with broadly triangular acute lateral laciniae and a hastate apical portion terminating in two divergent, flexuous, sinuous cirrhi; peltate callus, each lobe is quadrate, emarginate and provided with a finger-like dorsal extension topping the emarginate apex; whole lip 4 cm. across expanded lateral lobes and 3 cm. long excluding apical cirrhi; column short, fleshy, cylindric; pedicellate ovary to 3.5 cm. long.



Lip and callus of *P. Aphrodite*.

Distribution: Philippine Islands: Bataan, Camiguin, Luzon, Mindoro, Bilirau, Leyte, Samar, Negros. Babuyan Islands. Taiwan (Formosa). Sulu Archipelago.

PHILIPPINES. Luzon Island, Manila. Coll. Cuming 2092! (BM,K,L,P,W); Coll. Wallis s.n.! (W). Prov. Laguna, Baños. Coll. Wilkes s.n.! (AMES,W). Prov. Tayabas. Guinayangan. Coll. Escritor 20856! (AMES,US); Laguimanoc. Coll. Merrill 4017! (AMES). Prov. Ifugao. Coll. McGregor 20026! (AMES). Prov. Rizal. Coll. Ramos 3058! (AMES); Coll. Reillo 19242! (AMES). Prov. Sorsogon, Mt. Balusan. Coll. Elmer 15478! (AMES,NY). Bohol Island, Bilar. Coll. Ramos s.n.! (AMES). Samar Island. Coll. Ramos 17571! (AMES). TAIWAN. S. Cape. Coll. Henry 1705! (K,NY); Coll. Sasaki s.n.! (Z). KOTOSYO ISLAND. Coll. Mori 6906 (TAI), Sasaki 6905 (TAI), 6907 (TAI). SULU ARCHIPELAGO. Tawitawi Island, Tarawakan. Coll. Olsen 756 (C). ORIGIN UNKNOWN. Ex cult. Day 69! (K,W). Living cultivated flowers have also been studied.

Illustrations: Bot. Reg. 24: t. 34, 1838; Bot. Mag. 73: t. 4297, 1847 (as *P. amabilis* (L.) Blume); Warner & Wms., Orchid Album 1: t. 11, 1881 (as *P. amabilis* var. *Dayana* Hort.); The Garden 35:362, t. 697, 1889 (as *P. gloriosa* Rchb.f.); Katoh & Futakuchi, Orchids in Colour, pl. 113, fig. 3, 1974.

Observations: *Phalaenopsis Aphrodite,* as a distinct species from the Philippines, was first recognized by Reichen-

Distribution of *P. amabilis* (L.) Blume and *P. Aphrodite* Rchb.f.

bach in 1862. At that time he bravely pointed out that most of the plants in horticulture were wrongly named by Lindley; those from outside the Philippines called *P. grandiflora* were in reality the true *P. amabilis;* the ones from the Philippines called *P. amabilis* by Lindley represented a distinct species, *P. Aphrodite.*

The British growers did not heed the advice coming from a German. For a brief period one can find references to *P. amabilis* in the Lindleyan sense and in the Reichenbachian sense in horticultural publications, but even this vague distinction soon became lost. And as for today, anything passes for *P. amabilis.*

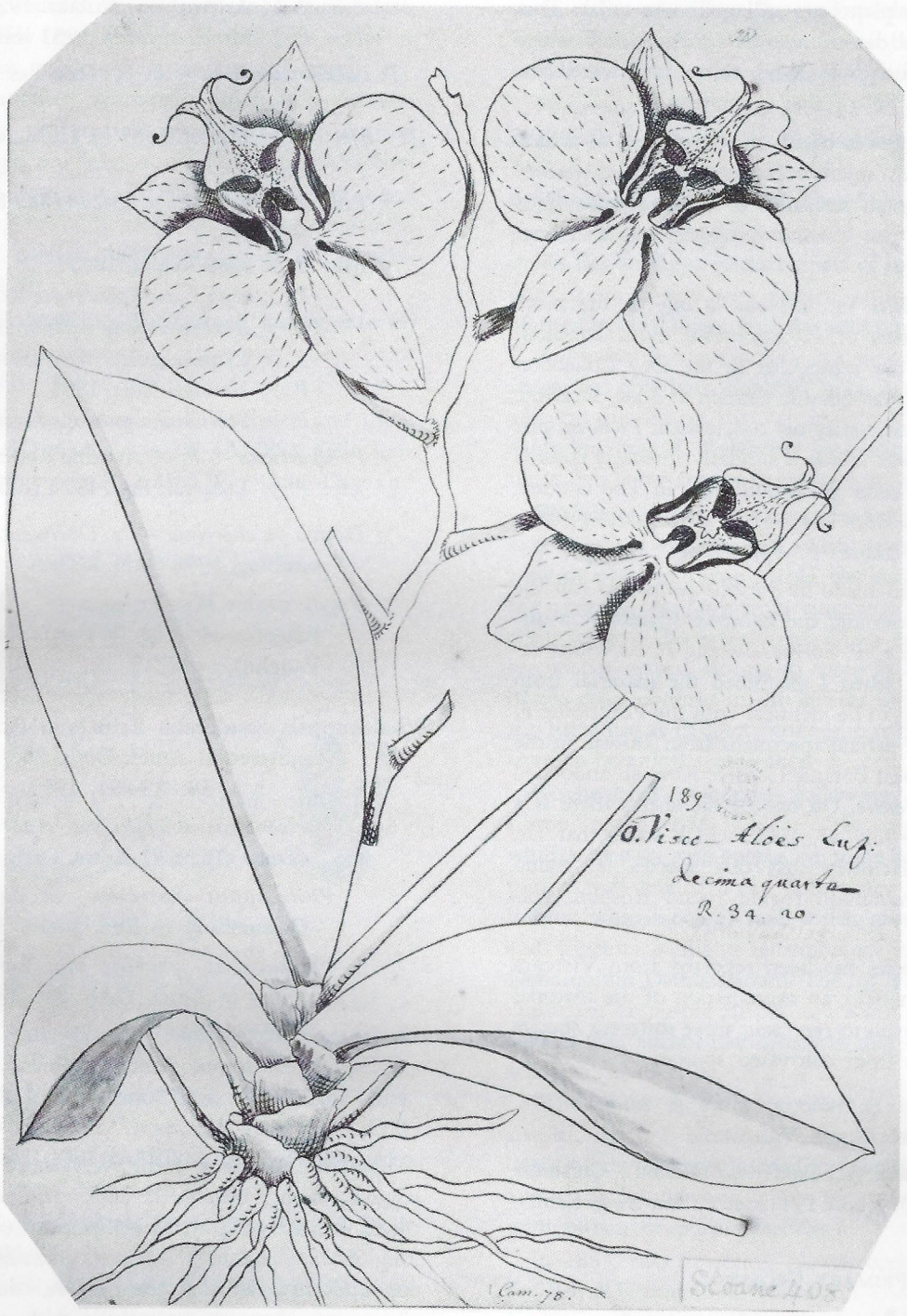
As will be seen from the map *Phalaenopsis Aphrodite* has a much more restricted distribution, namely on the islands north of Mindanao in the Philippine Archipelago: Bohol, Camiguin, Mindoro, Bilirau, Leyte, Samar, Negros, Luzon, and thence north of the Philippines to the islands in the Luzon Strait, Babuyan and Batan Islands and Taiwan.

This species was once common in both primary and secondary forests and flowers throughout the year in its native habitat. The flowers are quite variable. The sepals are white with a cream or greenish hue; the lateral sepals occasionally have minute carmine dots on the inner basal half. The petals are white, occasionally with a cream-colored flush at the base. The lip is basically white with the base of the lateral lobes dotted or striped carmine. The midlobe has a crimson overlay basally. The margins of the lateral lobes and midlobe which face one another have golden yellow markings. The callus is golden yellow to orange-yellow spotted with fine carmine dots.

Phalaenopsis Aphrodite has been and is still confused with *P. amabilis.* The sagittate-hastate lip with its carmine markings separates it, however, from any of the related species.

As it was pointed out earlier, *P. Aphrodite* is readily identified by the shape of the peltate callus at the junction of the lateral lobes and midlobe. No other species in this complex has a finger-like extension protruding dorsally and topping the quadrate emarginate lobes of the callus.

The actual discovery of *P. Aphrodite* belongs to a poorly known Jesuit brother, Georg Joseph Kamel [1661-1706]. He joined the Jesuit order in 1683, and soon was sent to the Marianas Islands, and from there to Manila, Philippines. Fortunately, he was well-versed in botany, in addition to being gifted with an artistic talent. Thus, he became the first collector and recorder on Philippine plants. Kamel contributed the first paper ever to be published on Philippine plants to John Ray's Historia Plantarum, vol. 3, in 1704. Due to lack of funds Kamel's drawings were omitted by Ray. However, some of these drawings were printed



Phalaenopsis Aphrodite. **Copy of original India ink drawing by Kamel in the Sloan manuscript preserved in the British Museum of Natural History, London, England.**

posthumously in a much reduced size by the self-promoting Petiver in his Gazophyllacii Naturae et Artis, in 1709. It is most remarkable that, among the first plants to be reported and illustrated from the Philippines, *P. Aphrodite* is included; a good indication that because of its beauty this species must have been quite common already at that time. Kamel's original India ink drawing of *P. Aphrodite* is reproduced here, which is from the Sloan manuscripts preserved in the British Museum of Natural History, London, England. The most curious thing which pertains to the history of these Philippine plants is that Linnaeus in his Species Plantarum intentionally neglected Kamel's publication of Luzon Plants, referring to them as *"Descriptiones imperfectae. Florum nulla noticia"* (Bibl. Bot. ed. alt. 156, 1751). Yet, among others *P. Aphrodite* was described in detail by Kamel in Ray (vol. 3; Appendix 34, No. 20, 1704) under the polynomial *Visco-Aloes Luzonis decima quarta,* and in his language of the 17th century, he likens the appearance of the floral parts to a dove.

For some reason, possibly because of the precedence set

by Linnaeus, Kamel's plants are still unknown today. This lovely species escaped detection until 1837, when Cuming sent the first specimen to England where it flowered for the first time in the fall of that same year.

Phalaenopsis ambigua is based on a specimen of which the leaves resemble *P. amabilis* rather than *P. Aphrodite;* i.e., lacking the purplish suffusion of *P. Aphrodite.* This condition alone does not warrant recognition as a distinct species.

Phalaenopsis amabilis var. *Dayana* is one of the more intensely colored forms of *P. Aphrodite.* Both Reichenbach's material and the watercolor in the Day Collection of drawings in the Royal Botanic Garden at Kew, England, which I have examined, verify my conclusions. *Phalaenopsis amabilis* var. *erubescens* is also a similarly intensely colored form. Moreover, the color plate published in The Garden, t. 697, 1889 as *P. gloriosa* is a wrong identification, for it represents a brightly colored *P. Aphrodite.*

Attempts have been made by various people to call the plants native to Taiwan and the Babuyan Islands by a distinct specific name; e.g., *P. Formosana* and *P. Babuyana* respectively. However, when I examined the material from Taiwan, I found them to be identical with the Philippine *P. Aphrodite.* There are several specimens from Taiwan in the Herbarium of the Royal Botanic Garden, Kew, all annotated by Rolfe as *P. Aphrodite.* On one of the sheets there is a note by Rolfe dated July 17, 1909, which states that Dr. Ito wrote to Mr. Hemsley that this species is "found abundantly in the mountain region round Koshun, Formosa."

Although this species has been reported from Vietnam (Indochine) by Gagnepain, an examination of the material cited by him has proven to represent three different species which are obviously from cultivated sources.

Excluded Variety

Phalaenopsis Aphrodite var. *Sanderana* (Rchb.f.) Quisumb. in Phil. Journ. Sci. 74:182, 1941. See *P. Sanderana* Rchb.f.

Primary Crosses

P. Aphrodite Rchb.f.*

× *P. amabilis* = *P.* × Gilles Gratiot. 1920 (Gratiot)
Syn.: *P.* × Harmony. 1935 (Armacost & Royston)
P. × Bataan. 1943 (Rapella)

× *P. equestris* = *P.* × *intermedia* Lindl. 1860
Syn.: *P.* × *Lobbii* Hort. ex Rchb.f. 1863. *Nomen.*
P. × *Aphroditi-equestris.* 1864
P. × Artemis var. Niitaka. 1924 (Iwasaki)
P. × M. de Almeida. 1957 (Hung Che-Ying)

P. Lueddemanniana = *P.* × Versailles. 1929 (Vacherot & Lecoufle)
Syn.: *P.* × Pierrot. 1961 (J. H. Miller)

× *P. Sanderana* = *P.* × Yoshino. 1924 (Iwasaki)

× *P. Schillerana* = *P.* × *leucorrhoda* Rchb.f. 1875 (Nat. Hybr.)
Syn.: *P.* × *casta* Rchb.f. 1875
P. × *Aphrodite-Schillerana* Rchb.f. 1875
P. × *Rothschildiana* Rchb.f. 1887 (Veitch)
P. × Cynthia Rolfe. 1890 (Sander)
P. × *Youngii* Hort. 1894
P. × *Schillerano-gloriosa* Rolfe. 1897

× *P. Stuartiana* = *P.* × Ariadne Rolfe. 1896 (Veitch)
Syn.: *P.* × Leda var. Fuji. 1924 (Iwasaki)

× *Doritis pulcherrima* = × *Doritaenopsis* Eduardo Quisumbing. 1956 (J. H. Miller)

× *Papilionanthe* Miss Joaquim = × *Phalaenopapilio* Explorer. 1959 (as × *Vandaenopsis* Explorer. Vaughn)

Phalaenopsis Sanderana Rchb.f. in Flora 65:466, 1882; Sweet in Amer. Orch. Soc. Bull. 38:888-891, 1969.

Syn.: *Phalaenopsis amabilis* var. *Aphrodite* subvar. *Sanderana* (Rchb.f.) Ames, Orch. 2:228, 1908.
Phalaenopsis Aphrodite var. *Sanderana* (Rchb.f.) Quisumbing in Phil. Journ. Sci. 74:182, 1941.
Phalaenopsis amabilis var. *Sanderana* (Rchb.f.) Davis in Amer. Orch. Soc. Bull. 18:744, 1949. *Nomen illeg.*

Type: Philippine Islands. Mindanao. Introduced by Sander and flowered in 1882. Coll. Roebelen s.n.! (W).

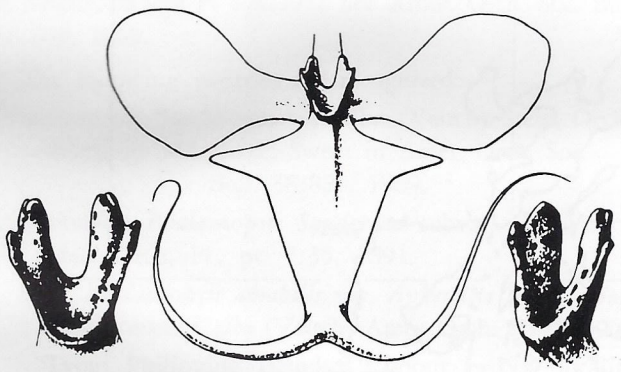
Epiphytic, pendent; stems very short, few-leaved; roots copious, fleshy, coarse, flexuous, glabrous; leaves one to three, rather small, fleshy, elliptic or oblong-elliptic, oblong-obovate, obtuse or rounded, gradually tapering toward conduplicate base, dark green above, often marked with a silvery gray beneath, sometimes with a brownish purple suffusion, up to 27 cm. long and 9 cm. wide; inflorescence purplish, racemose, rarely with few branches, much surpassing the leaves, up to 80 cm. long, but commonly shorter, few- to several-flowered; bracts inconspicuous, scarious, triangular-cucullate, to 4 mm. long; flowers rather delicate in texture, similar in appearance to *P. Aphrodite* Rchb.f., but colored; dorsal sepal ovate or ovate-elliptic, obtuse or rounded, up to 3.5 cm. long and 2.3 cm. wide; lateral sepals obliquely ovate, somewhat undulate, dorsally subcarinate, obtuse, up to 3.5 cm. long and 2.2 cm. wide; petals subrhomboid in outline, obtuse or rounded, tapering to a cuneate base, rarely unguiculate with subundulate margins,

*The above list pertains to all names reported in the literature as interpreted in taxonomy. It is not possible always to determine what the actual species was that the hybridizer had at hand when he used the binomial, *Phalaenopsis Aphrodite.*

up to 3.8 cm. long and 3.8 cm. wide; lip long unguiculate, 3-lobed; lateral lobes erect, from a cuneate base ovate or obliquely spathulate; midlobe sagittate-hastate, lateral laciniae narrowly triangular, acuminate, midlacinia cuneate-hastate anchoriform, terminating in two cirrhi; at junction of lateral lobes and midlobe a conduplicate, horseshoe-shaped callus, each lobe provided with a prominent lateral tooth; whole lip up to 3 cm. long, width across expanded lateral lobes 4 cm.; column short, fleshy, cylindric; pedicellate ovary 3 cm. long.

Distribution: Endemic to Philippines, locally rare on Mindanao Island, Igat Island in Dumanquilas Bay, Balut and Saragani Islands.

PHILIPPINES. Mindanao Island. Coll. Roebelen s.n.! (W); Coll. Loher 5381! (K); Coll. Lyon 28! (AMES); Cult. Low s.n.! (W); Cult. Sander s.n.! (AMES,W); Cult. Day s.n.!



Lip and callus of *P. Sanderana.*

(K,W). Prov. Zamboanga Malangas. Coll. Ramos & Edaño 37109! (AMES). Prov. Davao, Todaya, Mt. Apo. Coll. Mearns s.n.! (AMES,US); Coll. Elmer 10716! (AMES); Lake Lanao. Coll. Clemens s.n.! (US); Santa Cruz. Coll. Williams 3053! (NY). Prov. Cottabato, Mapag River. Coll. Weber 197! (AMES), 198! (AMES), 203! (AMES). Also living cultivated flowers have been studied.

Illustrations: Cogn. & Gooss., Dict. Icon. Orchid. Phalaenopsis pl. 2, 1903; Warner & Williams, Orch. Album 5: t. 209, 1886; Katoh & Futakuchi, Orchids in Colour, pl. 113, fig. 2, 1974.

Observations: *Phalaenopsis Sanderana* Rchb.f., named in honor of Frederick Sander, was introduced by him in 1882 through specimens collected by Roebelen. Soon afterward Burke collected material for Veitch. When this species was first flowered in England in 1882, it was believed to be a natural hybrid between *P. Aphrodite* and *P. Schillerana.* Some, however, believed it to be a variety of *P. Aphrodite* due to the superficial appearance of the flowers, especially the white forms. A critical examination of the callus between the lateral lobes of the lip as well as the outline of the lip makes such beliefs completely unfounded. The horseshoe-shaped callus of *P. Sanderana* is not only distinct from those of the other large-flowered species in this section, but it is so unique that in no way can it be visualized or interpreted to be the result of simple hybridization.

Phalaenopsis Sanderana is restricted and also rather localized in its distribution in the province of Davao and Amboanga on the southern side of the island of Mindanao, as well as on the islands of Balut and Saragami off the southern tip of the province of Davao and on the islets in Dumanquilas Bay on the southeastern end of the province of Amboanga. It has already been pointed out in the May, 1971 issue of the Orchid Digest, that the geographical distribution of *P. Aphrodite* does not include Mindanao. *Phalaenopsis Schillerana* has only been reported from Luzon and some of the adjacent islands on the Pacific side. Consequently any assumption that *P. Sanderana* is a natural hybrid between these two latter species is without foundation.

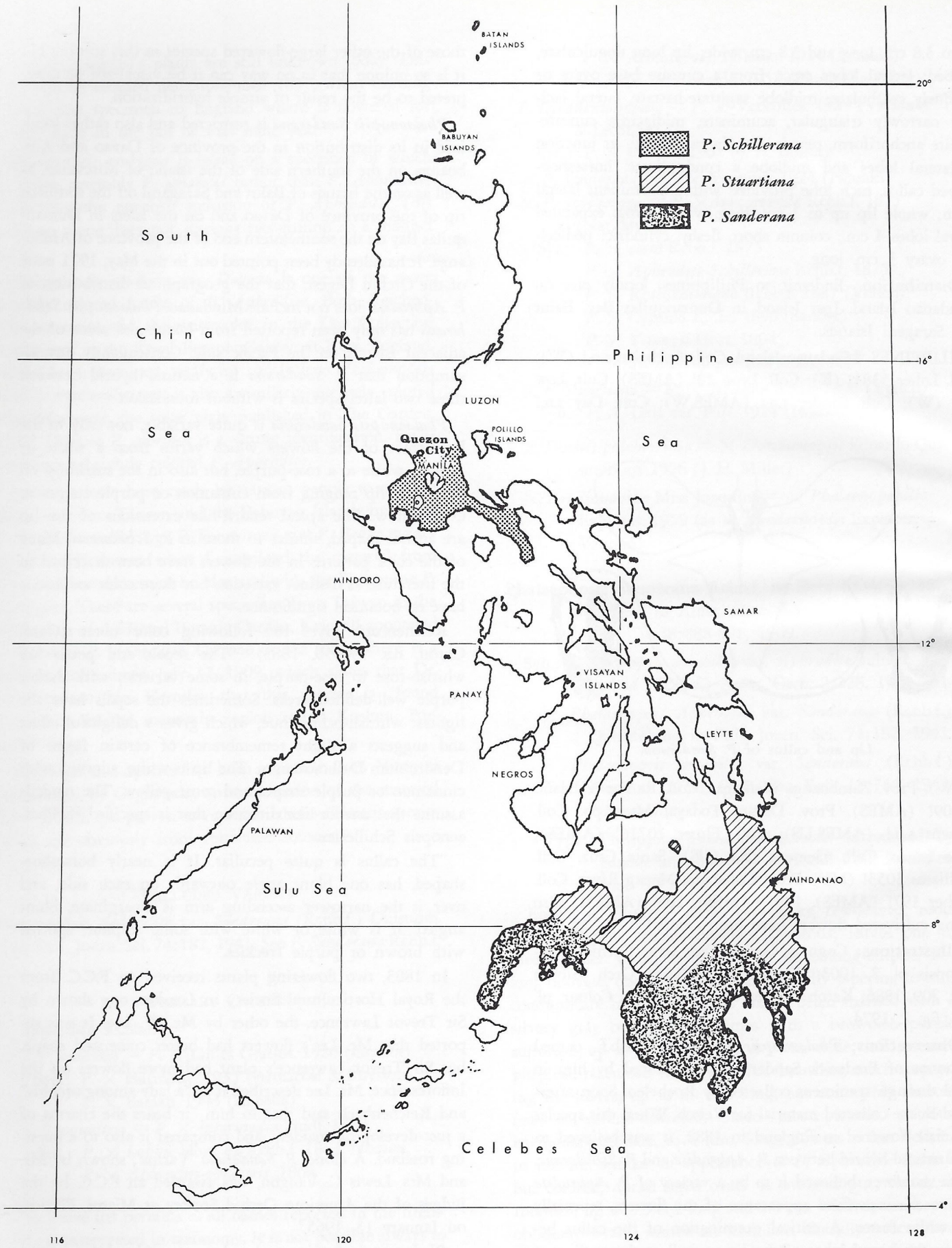
Phalaenopsis Sanderana is quite variable, not only in the base color of the flowers which varies from a white or pinkish white to a rose-purple, but also in the markings on the white lip ranging from cinnamon or purple stripes to even yellow. The apical tendril-like extensions of the lip are anchor-shaped, similar to those in *P. Schillerana.* Many of the color patterns in the flowers have been described in the literature as distinct varieties, but these color variations have no botanical significance.

Reichenbach gives the following color notes (Gard. Chron. n.s. 19:656, 1883): "The sepals and petals are whitish-rose to rose-purple, in some varieties with darker purple well-defined areas. Sometimes the sepals have the lightest whitish-ochrey hue, which gives a delightful effect and suggests a slight remembrance of certain forms of Dendrobium Dalhousianum. The lip is white, adorned with cinnamon or purple stripes and some yellow. The tendrils assume that anchor-like direction that is specified in Phalaenopsis Schilleriana. . . .

"The callus is quite peculiar. It is nearly horseshoe-shaped, has one blunt angle outwards on each side, and over it the narrower ascending arm is emarginate, blunt angled. It is white or white with some sulphur, spotted with brown or purple freckles."

In 1883, two flowering plants received an F.C.C. from the Royal Horticultural Society in London, one shown by Sir Trevor Lawrence, the other by Mr. W. Lee. It was reported that Mr. Lee's flowers had better color and shape, but Sir Trevor Lawrence's plant had more flowers on the inflorescence. Mr. Lee described it as "a lady among orchids" and Reichenbach said that to him "it bears the charms of a just developing maiden" and compared it also to a bursting rosebud. A clone, *P. Sanderana* 'Varina', shown by Mr. and Mrs. Lewis C. Vaughn, was awarded an F.C.C. by the judges of the American Orchid Society at Miami, Florida, on January 13, 1965.

Phalaenopsis Sanderana has been considered by several orchidologists to be a variety of *P. Aphrodite* due to the general appearance of the flower. An examination of the



Map of the Philippines to show distribution of *P. Schillerana, P. Stuartiana* and *P. Sanderana.*

structure of the callus on the one hand, and the outline of the lip on the other hand, makes such a union very unnatural. As a matter of fact, as pointed out earlier, the horseshoe-shaped callus of *P. Sanderana* is so distinct from that of either *P. amabilis* and *P. Aphrodite* or any other Philippine species, that it is difficult to visualize it to be the result of a simple hybridization. Admittedly the occurrence of silvery mottling on the leaves suggests some kind of introgression which took place a long time ago, so that today these local populations of *P. Sanderana* behave in the manner of a true species.

Attention is called to the hybrid between *P. Sanderana* and *P. equestris,* called *P.* × *Hebe* Rolfe in Orch. Rev. 5: 79, 1897. Since the binomial, *P.* × *Hebe* Rolfe, is preempted by a species described by Reichenbach in Hamb. Gartenz. 18:35, 1862, the hybrid name given by Rolfe as cited above must receive a new epithet. Therefore, I proposed the name, *P.* × *Rolfeana,* for the hybrid between *P. Sanderana* and *P. equestris.* See Amer. Orch. Soc. Bull. 38:889, 1969.

The following varieties are recognized:

Phalaenopsis Sanderana var. **alba** (Veitch) Stein, Orchideenbuch 511, 1892; Sweet in Amer. Orch. Soc. Bull. 38:889, 1969.

Basionym: *Phalaenopsis Sanderana* subvar. *alba* Veitch, Man. Orch. Pl., pt. 7:35, 1891.

Syn.: *Phalaenopsis amabilis* var. *Aphrodite* subvar. *Sanderana* f. *alba* (Veitch) Ames, Orch. 2:228, 1908.

Type: Philippine Islands. Without precise locality. Cult. Veitch s.n. No specimen preserved. Neotype: Sander s.n.! (K), (Sweet, Amer. Orch. Soc. Bull. 38:890, 1969).

Phalaenopsis alcicornis Rchb.f. in Gard. Chron. ser. 3, 1:799, 1887.

Type: Origin unknown. Cult. Sander s.n.! (K).

Phalaenopsis Sanderana var. *pulcherrima* Rolfe in Orch. Rev. 19:310, 1911.

Type: Philippine Islands. Cult. Sander s.n.! (K).

This is merely an albino form of the species. The flowers are white with a few light purple spots at the base of the lateral lobes of the lip and with a few yellow spots on the callus.

Distribution: Philippines. Mindanao. Cult. Veitch s.n.! (K); Cult. Sander s.n.! (K); Cult. Low s.n.! (W).

Illustration: Veitch, Man. Orch. Pl., pt. 7:35, fig., 1891.

Observations: There is a specimen in the Herbarium at the Royal Botanic Garden, Kew, England, which was received from Messrs. F. Sander & Co., St. Albans, England, in April 1890, with the following remarks: "Phalaenopsis Sanderiana with pure white flowers, except the markings on the lip." It is most probable that Veitch's material stems from this same introduction.

An examination of the type specimens of *P. alcicornis* as well as a colored drawing of it by Reichenbach indicates that this species is merely a small-flowered albino form of *P. Sanderana* because of the shape of its callus.

Phalaenopsis Sanderana var. **marmorata** Rchb.f. in Gard. Chron. n.s. 20:812, 1883; Sweet in Amer. Orch. Soc. Bull. 38:890, 1969.

Syn.: *Phalaenopsis Sanderana* subvar. *marmorata* (Rchb.f) Veitch, Man. Orch. Pl., pt. 7:35, 1891.

Phalaenopsis amabilis var. *Aphrodite* subvar. *Sanderana* f. *marmorata* (Rchb.f.) Ames, Orch. 2: 228, 1908.

Type: Philippine Islands. Introduced in 1883. Cult. Low. Coll. Barber s.n.! (W).

Phalaenopsis Sanderana var. *punctata* O'Brien in Gard. Chron., ser. 3, 7:78, 1891.

Phalaenopsis Sanderana subvar. *punctata* (O'Brien) Veitch, Man. Orch. Pl., pt. 7:35, 1891.

Phalaenopsis amabilis var. *Aphrodite* subvar. *Sanderana* f. *punctata* (O'Brien) Ames, Orch. 2:229, 1908.

Type: Philippine Islands. Cult. Low s.n.! (W).

Reichenbach gives the following color notes: "Sepals and petals tinged outside yellowish white, with a certain green hue. . . . The lateral sepals have numerous rows of purple spots at the base. The side laciniae show three broad basilar purple bars, nearly parallel, and some purple spots. The mid lacinia is neatly marbled with fine purple stains on the side, purple dots in mid-line, and a very light purple wash between those three areas."

Distribution: Philippine Islands. Mindanao. Only the type collections have been seen.

Observations: The description given by O'Brien for *P. Sanderana* var. *punctata* approximates, if not very similar to, the description given by Reichenbach for his var. *marmorata.* Moreover, both varietal names are based on plants cultivated by Messrs. Hugh Low & Co.

PRIMARY CROSSES

Phalaenopsis Sanderana Rchb.f.

× *P. amabilis* = *P.* × Rimesand. 1923 Guillaumin

Syn.: *P.* × Versailles. 1929 (Vacherot & Lecoufle)
P. × Alger. 1930 (Vacherot & Lecoufle)
P. × La Purissima. 1940 (Armacost & Royston)

× *P. amboinensis* = *P.* × Doc Charles. 1961 (J. H. Miller)

× *P. Aphrodite* = *P.* × Yoshino. 1924 (Iwasaki)

× *P. cornu-cervi* = *P.* × Lokelani. 1949 (Kirsch)

× *P. equestris* = *P.* × *Rolfeana* Sweet.

Syn: *P.* × *Hebe* Rolfe. 1897, not Rchb.f., (Veitch) 1862

× *P. Lindeni* = *P.* × Robert W. Miller. 1960 (J. H. Miller)

× *P. Lueddemanniana* = *P.* × Mrs. J. H. Veitch. 1899 (Veitch)

Syn.: *P.* × *Veitchiae.* 1899 (Veitch)
P. × Luzon. 1958 (Rivermont)

× *P. Mannii* = *P.* × Sandman. 1967 (Thornton)

× *P. Mariae* = *P.* × Talisman. 1962 (Vaughn)

× *P. Schillerana* = *P.* × Grand Condé. 1929 (Vacherot & Lecoufle)

× *P. Stuartiana* = *P.* × Amphitrite Kraenzlin. 1892 (Sander)

Syn.: *P. Stuartiana* var. *Hrubyana* Rchb.f. 1881
P. × *Wiganiae* Hort. 1899 (Low)
P. × *Schillerano-Stuartiana.* 1900 (Low)

× *P. violacea* = *P.* × Hans Burgeff. 1960 (Ceylon Bot. Gdns.)

× *Doritis pulcherrima* = × *Doritaenopsis* Profusion. 1961 (Vaughn)

× *Renanthera coccinea* = × *Renanthopsis* Coral Star. 1959 (Vaughn)

× *Renanthera Imschootiana* = × *Renanthopsis* Premier. 1931 (Vacherot & Lecoufle)

× *Renanthera monachica* = × *Renanthopsis* Jan Goo. 1950 (Goo)

× *Renanthera Storiei* = × *Renanthopsis* Red Riding Hood. 1952 (Mrs. J. Goo)

× *Vanda Amesiana* = × *Vandaenopsis* Hawaii. 1950 (Kirsch)

× *Vanda coerulea* = × *Vandaenopsis* Blue Queen. 1952 (Mrs. J. Goo)

× *Vanda Merrillii* = × *Vandaenopsis* Kahekili. 1956 (Kirsch)

Phalaenopsis Schillerana Rchb.f. in Hamburg. Gartenz. 16:115, 1860; Sweet in Amer. Orch. Soc. Bull. 38:891, 1969.

Type: Philippine Islands. Luzon. Introduced in 1858 and cultivated by Consul Schiller. Coll. M. Porte s.n.! (W).

Syn.: *Phalaenopsis Schillerana* var. *viridi-maculata* Ducharte in Journ. Soc. Imp. et Centr. d'Hort. 8: 609, t. 17, 1862.

Lectotype: No specimen is known. Plate, t. 17, in Journ. Soc. Imp. et Centr. d'Hort 8: 1862, is selected here. *In hoc loco!*

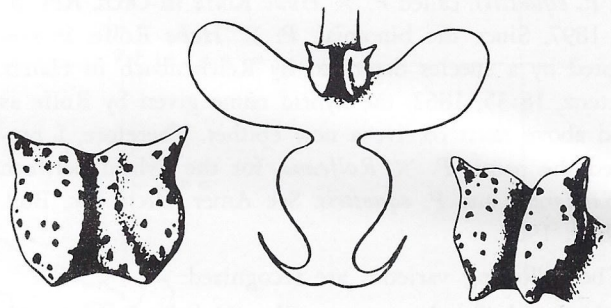
Phalaenopsis Schillerana var. *delicata* Dean in Floral Mag. n.s. 6: t. 257, 1877.

Lectotype: No specimen is known. Plate, t. 257, in Floral Mag. n.s. 6: 1877, is selected here. *In hoc loco!*

Phalaenopsis Schillerana var. *compacta nana* Hort. in Gard. Chron., ser. 3, 7:356, 1890. *Nomen.*

Phalaenopsis Schillerana var. *odorata* van Brero in Die Orchidee 4:23, 1935. *Nomen illegit.*

Epiphytic; stem robust, short, completely enclosed by imbricating leaf-bases and copious, fleshy, very heavy, long, somewhat flexuous, flat, glabrous roots; leaves fleshy, dark green with silvery gray marmorations on upper surface, purplish below, elliptic or oblong-elliptic, narrowly obovate or oblanceolate, obtuse, up to 45 cm. long and 11 cm. wide; inflorescence pendulous, rarely racemose, commonly paniculate, often purplish, loosely flowered with up to 250 or more flowers; bracts inconspicuous, ovate-cucullate, to 5 mm. long; flowers rather delicate, showy, fragrant; dorsal sepal elliptic or ovate-elliptic, obtuse or rounded, up to 3.5 cm. long and 1.6 cm. wide; lateral sepals similar to dorsal, somewhat oblique, commonly more ovate, as long as dorsal



Lip and callus of *P. Schillerana.*

sepal; petals rhomboid, somewhat unequal, slightly undulate, obtuse or rounded above, occasionally subretuse, tapering into a cuneate-subunguiculate base, up to 4.0 cm. long and 4.0 cm. wide; lip variable, with prominent claw, 3-lobed; lateral lobes from cuneate base suborbicular or elliptic, spreading and not parallel with the column; midlobe subrotund with two short divergent anchoriform appendages; length of whole lip up to 22 mm.; width across expanded lateral lobes up to 34 mm.; between lateral lobes at base there is a conduplicate, subquadrate basally truncate callus; column short, fleshy, cylindric; pedicellate ovary up to 4 cm. long.

Distribution: Endemic in the Philippines: Luzon (Provinces of Rizal, Laguna and especially Tayabas), and Biliran Island (south of Luzon and just north of Leyte) and adjacent small islands on the Pacific side.

PHILIPPINES. Luzon Island. Cult. Schiller. Coll. Porte s.n.! (P,W); Coll. Wallis s.n.! (W); Coll. Ramos 20460! (AMES); Coll. Loher 588! (K,P,US); Coll. Loher 5382! (K), 5383! (K); Coll. Lyon 54! (AMES). Prov. Rizal. Coll. Loher 14033! (AMES). Prov. Tayabas. Atmonan. Coll. Merrill 4024! (AMES). Biliran Island. Coll. Meyer s.n.! (W). Also living cultivated flowers have been studied.

Illustrations: Xenia Orchid. 2: t. 101, 1862; Warner, Sel. Orch. Pl. 1: t. 1, 1862; Ill. Hort. 10: t. 348, 1863; Flore de Serres 15: t. 1559-60, 1864; The Garden 22: t. 348, 1882; Lindenia 5:73, t. 227, 1890; Cogn. & Gooss., Dict. Icon. Orchid. Phalaenopsis t. 10, 1890; Amer. Orch. Soc. Bull. 39:606, 1970; Katoh & Futakuchi, Orchids in Colour, pl. 113, fig. 1, 1974.

Observations: The color of the flowers is quite variable, ranging from a white to soft pink or mauve to a bright rosy purple which often fades to white at the margins. The sepals and petals are a soft pink fading to a white border. The basal halves of the lateral sepals are densely dotted with deep carmine-purple. The lip, especially the midlobe, ranges from an almost white to a very deep magenta. The basal inner halves of the lateral lobes are marked with carmine to reddish brown dots on a yellow base. The extensions of the anchor-shaped apical portion of the midlobe may be almost wanting or well developed into filiform segments. A large number of forms connecting these two extremes have been depicted for a comparative study on two plates in the famous Day collection of drawings now in the herbarium of the Royal Botanic Garden, Kew, England. These drawings were prepared at the time when extensive importations of this species to England were undertaken by Low. Therefore, these may be regarded as a good analysis of the naturally occurring variations. The base color of the midlobe varies from a solid magenta to almost white or colored only along the basal part of the midvein. The magenta coloration is uncommon in the lateral lobes.

The yellow callus between the lateral lobes as shown in the ink drawings is quite distinct from that of *P. Stuartiana.* Actually it is located at the base, i.e., at the junction of the claw and the midlobe between the lateral lobes; in *P. Stuartiana* it is more centrally situated right on the midline at the division between the midline and the lateral lobes.

Phalaenopsis Schillerana was introduced in 1859 by Consul Schiller at Hamburg, Germany, who obtained it from Manila in 1858 via M. Porte. Out of 30 plants in the original shipment he succeeded in saving only one which flowered first in March 1860. In the same year it was described by Reichenbach. According to Porte the plants were found growing at an elevation of 300-400 meters on the declivities of the mountains.

Phalaenopsis Schillerana, according to John Miller (Orch. Dig. 38:219, 1974) was common on the outstretched limbs of tall trees arching over the main highway coursing up into the mountains; usually they have to be in flower to be detected. Those which are growing at higher elevations are definitely deeper in color than the plants growing at sea level (also true for *P. Lindenii* and *P. Sanderana*).

Robert Warner was apparently the first to flower it in England in 1862. The plants are very floriferous for there are many reports of plants having several inflorescences with a total of 100 up to 400 flowers. In the Gardeners' Chronicle of 1881, there is a specimen reported with two inflorescences having a total of 733 flowers and buds, 531 being fully expanded at the time when the plant was purchased for all of 25 cents — of course in the Philippines. Both this species and *P. Sanderana* have been used extensively in breeding because of the pink- or mauve-colored flowers.

Attention is called to a form described by Reichenbach as *P. Schillerana* var. *vestalis* and later reported by Roebelen in 1890, in Gardeners' Chronicle as *P. Schillerana* var. *alba.* I have examined the type of *P. Schillerana* var. *vestalis* and find that it is referable to *P. Stuartiana.* My finding is strengthened by the fact that this supposed white form originates from the Island of Mindanao, which is the native habitat of *P. Stuartiana* and on that island *P. Schillerana* is absent. Consequently the so-called pure white forms of *P. Schillerana* are based on a wrong identification.

Moreover, it should be kept in mind that *P. Schillerana* var. *alba* is a taxonomic synonym of *P. Stuartiana* and, therefore, it is neither eligible nor applicable in designating albino forms of the genuine *P. Schillerana.*

It should be noted that the name of the putative hybrid *P.* × *Wiganiae* Hort. is based on wrong parentage. See discussion under *P. Stuartiana.* Therefore, no hybrids are known at present between *P. Schillerana* and *P. Stuartiana.* For the hybrid *P.* × *Schillerano-Stuartiana* Hort. see *P.* × *Amphitrite* Kraenzlin.

Because of the great variation in the flowers, several horticultural forms have been designated as distinct botanical varieties. Although these taxa are part of the main variation pattern of the species, they are enumerated here for horticultural reasons.

Phalaenopsis Schillerana var. **immaculata** Rchb.f. in Gard. Chron. n.s. 3:429, 1875; Sweet in Amer. Orch. Soc. Bull. 38:893, 1969.

Syn.: *Phalaenopsis Schillerana* subvar. *immaculata* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:37, 1891.

Type: Philippines. Introduced in 1874 and flowered by Low. Coll. Barber s.n.! (W).

Phalaenopsis Schillerana var. *advena* Rchb.f. in Gard. Chron. n.s. 23:174, 1885.

Type: Philippines. Cult. Low s.n.! (W).

Phalaenopsis Curnowiana Hort. in Gard. Chron. ser. 3, 9:268, 1891, *in textu.*

This variety is described by Rchb.f. as follows: "The flower has not a single dot or blotch at all. Now the callus is pure yellow. The lateral laciniae of the lip are pure white, with a violet border. . . ."

The form described as *P. Schillerana* var. *advena,* which is represented in color, differs from var. *immaculata* solely in lacking the violet border to the lateral lobes of the lip.

Phalaenopsis Curnowiana, of which there is a specimen in the Herbarium at the Royal Botanic Garden, Kew, England, has an annotation by Rolfe stating that he is unable to differentiate it from var. *immaculata.*

Distribution: Philippines. Luzon Island. Only type collections have been seen.

Phalaenopsis Schillerana var. **purpurea** O'Brien in Gard. Chron. ser. 3, 11:105, 1892; Sweet in Amer. Orch. Soc. Bull. 38:893, 1969.

Type: Philippines. Luzon Island. Introduced and flowered by Low s.n.! (K).

The flowers in this variety are a bright dark rosy purple which tends to become bluish with age.

Distribution: Philippines. Luzon Island. Only the type collection has been seen.

Phalaenopsis Schillerana var. **splendens** Warner, Sel. Orch. Pl. ser. 3: t. 5, 1878; Sweet in Amer. Orch. Soc. Bull. 38:893, 1969.

Neotype: Philippines. Luzon Island. Introduced and cultivated by Warner s.n., Warner, Sel. Orch. Pl. ser. 3: t. 5, 1878. No type specimen of this variety has been preserved, therefore, the color plate by Warner has been designated as the neotype. (Sweet in Amer. Orch. Soc. Bull. 38:893, 1969.)

Syn.: *Phalaenopsis Schillerana* var. *major* Hook. ex Rolfe in Gard. Chron. n.s. 26:212, 1886.

Type: Philippines. Introduced and cultivated by Veitch s.n.! (K).

Phalaenopsis Schillerana var. *grandiflora* van Brero in De Orchidee 4:23, 1935. *Nomen illegit.*

This variety is recognized by the marmoration on the leaves which consist of parallel oblong meshes, as well as by the unusually large flowers.

Distribution: Philippines. Luzon Island.

Illustration: Bot. Mag. 91: t. 5530, 1865.

Excluded Varieties

Phalaenopsis Schillerana var. *Stuartiana* (Rchb.f.) Burb. in Garden 22:119, 1882. See *P. Stuartiana* Rchb.f.

Phalaenopsis Schillerana var. *vestalis* Rchb.f. in Gard. Chron. n.s. 17:330, 1882. See *P. Stuartiana* Rchb.f.

Phalaenopsis Schillerana var. *alba* Roebelen in Gard. Chron. ser. 3, 7:459, 1890. See *P. Stuartiana* Rchb.f.

Phalaenopsis Schillerana subvar. *vestalis* (Rchb.f.) Veitch Man. Orch. Pl. pt. 7:37, 1891. See *P. Stuartiana* Rchb.f.

Primary Crosses

Phalaenopsis Schillerana Rchb.f.

× *P. amabilis* = *P.* × Confirmation. 1925 (Bultel)
Syn.: *P.* × Cherubin. 1935 (Vacherot & Lecoufle)

× *P. Aphrodite* = *P.* × *leucorrhoda* Rchb.f. 1875
Syn.: *P.* × *casta* Rchb.f. 1875
P. × *Aphroditi-Schilleriana* Rchb.f. 1875
P. × *Rothschildiana* Rchb.f. 1887
P. × Cynthia Rolfe. 1890
P. × *Youngii* Hort. 1894
P. × *Schillerano-gloriosa* Rolfe. 1897

× *P. amboinensis* = *P.* × Schillambo. 1968 (Thornton)

× *P. cornu-cervi* = *P.* × Britannia Guillaumin. 1923

× *P. equestris* = *P.* × *Veitchiana* Rchb.f. (Nat. Hybr.) 1872
Syn.: *P.* × *Equestri-Schillerana* Rchb.f. 1872
P. × *Gertrudeae* Quisumb. 1941
P. × *Viratatii* Quisumb. 1956

× *P. Lindeni* = *P.* × Baguio. 1966 (Moir)

× *P. Lueddemanniana* = *P.* × Regnier. 1922 (Regnier)

× *P. Mannii* = *P.* × Schillman Guillaumin. 1930
Syn.: *P.* × Bronze Maiden. 1964 (McCoy)

× *P. pallens* var. *denticulata* = *P.* × Tigre. 1922 (Regnier)

× *P. Parishii* = *P.* × Pink Heart. 1979 (Wallbrunn)

× *P. Sanderana* = *P.* × Grand Condé. 1929 (Vacherot & Lecoufle)

× *P. Stuartiana* = *P.* × *Schillerano-Stuartiana.* (Nat. hybr.)

× *Aerides Jarckiana* = × *Aeridopsis* Pink Taffeta. 1965 (Moir)

× *Arachnis Maingayi* = × *Arachnopsis rosea.* 1941 (Tjipeganti)

× *Ascocentrum miniatum* = × *Asconopsis* Mini-Coral. 1967 (Wallbrunn)

× *Doritis pulcherrima* = × *Doritaenopsis* Purple Passion. 1966 (Wallbrunn)

× *Sarcochilus Hartmannii* = × *Sarconopsis* Jean Cannons. 1970 (Cannons)

× *Vanda Dearei* = × *Vandaenopsis Deareiana.* 1940 (S. Oey)

Phalaenopsis Stuartiana Rchb.f. in Gard. Chron. n.s. 16: 748, 1881; Sweet in Amer. Orch. Soc. Bull. 38:893, 1969.

Syn.: *Phalaenopsis Schillerana* var. *Stuartiana* (Rchb.f.) Burb. in The Garden 22:119, 1882.

Type: Philippines. Mindanao Island. Introduced and cultivated by Low in 1881. Coll. Boxall s.n.! (W).

Phalaenopsis Stuartiana var. *nobilis* Rchb.f. in Gard. Chron. n.s. 16:748, 1881.

Type: Philippines. Mindanao Island. Cult. Low s.n.! (W).

Phalaenopsis Schillerana var. *vestalis* Rchb.f. in Gard. Chron. n.s. 17:330, 1882.

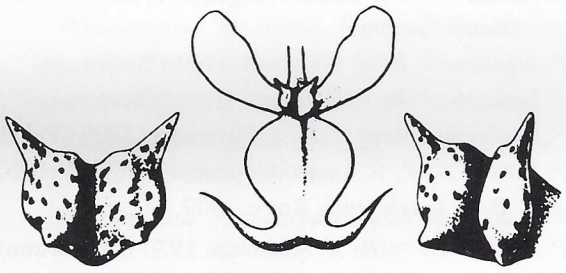
Phalaenopsis Schillerana subvar. *vestalis* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:37, 1891.

Type: Cult. Low s.n.! (W).

Phalaenopsis Schillerana var. *alba* Roebelen in Gard. Chron. ser. 3, 7:459, 1890.

Type: Cult. Low s.n.! (W).

Epiphytic; stem short, completely enclosed by conduplicate leaf-bases; roots many, fleshy, somewhat flexuous, glabrous; leaves few, arcuately pendent, fleshy, green above with silvery gray marmorations, purplish beneath, elliptic-oblong to oblanceolate, obtuse, gradually tapering to conduplicate base, up to 35 cm. long and 8 cm. wide; inflorescence arcuately pendent, purplish, racemose or paniculate, loosely many-flowered, up to 60 cm. long; bracts rather conspicuous, ovate-cucullate, up to 1 cm. long; flowers rather delicate in texture, but heavier than *P. Schillerana* Rchb.f. which it resembles in general shape and form, except for color; slightly fragrant; dorsal sepal elliptic or ovate-elliptic, slightly contracted at base, obtuse or rounded above, up to 3.5 cm. long and 1.5 cm. wide, commonly smaller; lateral sepals oblique, oblong-elliptic to ovate-elliptic, acute, up to 3.2 cm. long and 1.5 cm. wide; petals



Lip and callus of *P. Stuartiana*.

subrhomboid, occasionally 4-angled, rarely rhomboid-ovate, rounded or obtuse above, occasionally retuse, tapering to a cuneate base, up to 3.3 cm. long and 2.6 cm. wide; lip long-clawed, 3-lobed; lateral lobes obovate or oblanceolate, obtuse or rounded, tapering toward base where they are provided with a cushion-like thickening; midlobe suborbicular with an anchor-shaped apex, emarginate in front, appendages are falcate, acuminate; between lateral lobes there is a subquadrate to V-shaped callus with prominent, horn-like projections on each side, acute or obtuse at base; length of whole lip up to 2.5 cm. and 3.0 cm. across expanded lateral lobes; column cylindric, fleshy; pedicellate ovary up to 4 cm. long.

Distribution: Philippines. Endemic on Mindanao Island in the Agusan and Surigao Provinces.

PHILIPPINES. Mindanao Island. Coll. Boxall s.n.! (W). Prov. Agusan (Misamis). Maguganum. Coll. Weber 140! (AMES). Prov. Surigao. Coll. Loher s.n.! (K); Coll. Avis s.n.! (AMES); Coll. unknown s.n.! (AMES). Island unknown: Cult. Low s.n.! (W); Cult. Low s.n.! (W); Cult. Low s.n.! (W). Also living cultivated flowers have been studied.

Illustrations: Bot. Mag. 108: t. 6622, 1882; Warner & Williams, Orch. Album 5: t. 237, 1886; Reichenbachia 1: t. 42, 1888; Cogn. & Gooss., Dict. Icon. Orch. Phalaenopsis pl. 2, 1898; Katoh and Futakuchi, Orchids in Color, pl. 113, fig. 5, 1974.

Observations: *Phalaenopsis Stuartiana* Rchb.f. was described by Reichenbach in 1881, and named in honor of Stuart Low of the old firm of Hugh Low & Co. It is of interest that Reichenbach in July 1881, apparently had intended to name the species after Boxall, the original collector, for on one of his drawings in his own handwriting he corrected the name referring to Boxall and substituted it with *P. Stuartiana.*

This species has been reported from the island of Mindanao in the provinces of Agusan (Misamis) and Surigao which are located across the northern portion of the island. In the Orchid Herbarium of Oakes Ames a notation by E. D. Merrill states that: ". . . the commercial supply of this species comes from Agusan Valley, Roebelen usually went to Talacogon for his supply of this species." The Agusan valley is in the northeastern part of the Agusan province, whereas Talacogon is in the central part of Surigao.

The color of the flowers has been described by Reichenbach as "a delightful color, like the best Devonshire cream." He further adds the following color notes: "The sepals are outside of a light sulfur, and inside the interior halves of the lateral sepals are of the same colour, with dark cinnamon blotches. The side laciniae of the lip are pure white at the top, but with that exception orange as the callus, and central lacinia is light sulfur-coloured, with white borders and white tails. All those parts, as far as they are yellow or orange, are covered with dark cinnamon blotches."

The characteristic callus between the lateral lobes is subquadrate or V-shaped with prominent horn-like projections on each side and obtuse at the base. In *P. Schillerana* the callus is conduplicate, subquadrate, in front quite flat or truncate. In addition to this distinction, the outline of the midlobe of the lip in *P. Stuartiana* is suborbicular or circular in outline, whereas in *P. Schillerana* it is ovate. See the drawings.

This species is closely allied to *P. Schillerana;* as a matter of fact it may be looked upon as a vicarious species, but readily separable by its color and the shape of the callus.

As it was pointed out before, *P. Schillerana* var. *vestalis* and *P. Schillerana* var. *alba* represent *P. Stuartiana* for the native habitat of these species is mutually exclusive. That opinion has also been expressed by Quisumbing in the Philippine Journal of Science 76:91, 1941, a conclusion which he arrived at without having seen the type specimens.

Reichenbach's decision to describe the white form as *P. Schillerana* var. *vestalis* is quite understandable for the local distribution of this species at that time was not known to him.

Likewise, when the putative hybrid, *P. Wiganiae* was proposed, it was established on a specimen of a *P. Stuartiana* whose flowers had a purplish flush to the sepals and petals. Hence, it was assumed that it must be the result of natural hybridization between *P. Schillerana* and *P. Stuartiana,* since they do resemble one another in general morphology. Sev-

eral years before this putative hybrid was proposed. Reichenbach described the unique variety, *P. Stuartiana* var. *Hrubyana,* which also differed from the main type in having a purple flush on the sepals and petals. The uniqueness of this color combination in the absence of *P. Schillerana* in Mindanao became apparent to me when I studied the artificial hybrid, *P.* × Amphitrite Krzl., published in Gardeners' Chronicle, ser. 3, 11:618, 1892. I have seen specimens of this artificial hybrid which were obtained by crossing *P. Stuartiana* with *P. Sanderana.* It should be noted that both of these species are native to Mindanao. Hence the purplish flush in *P. Stuartiana*-like flowers.

Since the binomial *P. Wiganiae* is based on a wrong putative parentage, that name is no longer available for designating future crosses involving *P. Schillerana* and *P. Stuartiana.*

An examination of Reichenbach's material including the color sketch of his *P. Stuartiana* var. *nobilis* convinces me that the distinctions claimed by Reichenbach, ". . . the whole flower is sulfur-yellow, except the callus, which is orange. There are a few small mauve spots on the petals . . . ," are part of the normal color variation pattern of the species.

Although *P. Stuartiana* is quite variable in color, the following two major color departures from the regular pattern are recognized here because they were described as botanical varieties and because of their horticultural merits.

Phalaenopsis Stuartiana var. **bella** Rchb.f. in Gard. Chron. ser. 3, 3:200, 1888; Sweet in Amer. Orch. Soc. Bull. 38:896, 1969.

Type: Philippine Islands. Introduced from Mindanao in 1888, and cultivated by Low s.n.! (W).

Reichenbach gives the following description, "The new variety is distinct in its linear red marks on the side-laciniae, the lip very large, purple-chocolate blotches on the mid-lacinia of the lip."

Distribution: Philippines. Mindanao Island. Only the type specimen has been seen.

Phalaenopsis Stuartiana var. **punctatissima** Rchb.f. in Gard. Chron. n.s. 17:44, 1882; Sweet in Amer. Orch. Soc. Bull. 38:896, 1969.

Type: Philippines. Introduced from Mindanao in 1882 and cultivated by Low s.n.! (W).

Syn.: *Phalaenopsis Stuartiana* var. *punctulata* Linden in Lindenia 1:21, t. 8, 1885.

Lectotype: Philippine Islands. Mindanao. No specimen has been preserved. Plate t. 8 in Lindenia 1:21, 1885 is designated here. *In hoc loco!*

Reichenbach describes this variety as follows: "I propose this name for a fine variety which has numerous small mauve spots on the upper sepal, petals, and upper and inner side of the lateral sepals."

Distribution: Philippine Islands. Mindanao.

PHILIPPINE ISLANDS. Mindanao. Cult. Low s.n.! (W); Cult. Wrigley s.n.! (W).

Primary Crosses

Phalaenopsis Stuartiana Rchb.f.

× *P. amabilis* = *P.* × Leda Rolfe. 1888 (Veitch)
Syn.: *P.* × A. Benick. 1933 (Wolter)

× *P. amboinensis* = *P.* × Alice Millard. 1969 (Fort Caroline Orchids: Wallbrunn)

× *P. Aphrodite* = *P.* × Ariadne Rolfe. 1896 (Veitch)
Syn.: *P.* × Leda var. Fiji. 1924 (Iwasaki)

× *P. cornu-cervi* = *P.* × Stewed Corn. 1978 (Thornton)

× *P. equestris* = *P.* × Cassandra. 1898 (Veitch)

× *P. fimbriata* = *P.* × Kuanido Kristanto. 1976 (Kolopaking)

× *P. fuscata* = *P.* × Zuma's Angelita. 1978 (Zuma Canyon)

× *P. gigantea* = *P.* × Gretchen. 1969 (Wallbrunn)

× *P. Lindenii* = *P.* × Batangas. 1979 (Thornton)

× *P. Lueddemanniana* = *P.* × Hermione. 1899 (Veitch)

× *P. Mannii* = *P.* × *Stuartiano-mannii.* 1898 (Veitch)
Syn.: *P.* × *langleyensis* Rolfe. 1909

× *P. Micholitzii* = *P.* × Micholart. 1970 (Wallbrunn)

× *P. pallens* = *P.* × Moonrise. 1969 (Crestwood Orchids)

× *P. Sanderana* = *P.* × Amphitrite Krzl. 1892
Syn.: *P. Stuartiana* var. *Hrubyana* Rchb.f. 1881
P. × *Wiganiae* Hort. 1899 (Low)

× *P. Schillerana* = *P.* × *Schillerano-Stuartiana.* 1900 (Low)

× *P. sumatrana* = *P.* × Susanti. 1975 (Kolopaking)

× *P. violacea* = *P.* × *punctatissima* Guillaumin. 1923

× *Doritis pulcherrima* = × *Doritaenopsis* Bonita. 1965 (Vaughn)

× *Renanthera monachica* = × *Renanthopsis* Mildred Jameson. 1969 (Fort Caroline Orchids: Wallbrunn)

× *Renanthera Storiei* = × *Renanthopsis* Kamehameha. 1950 (Kirsch)

Natural Hybrids

Phalaenopsis × **intermedia** Lindl. in Paxton, Fl. Gard. 3:162, 1853, *pro. sp.;* Sweet in Amer. Orch. Soc. Bull. 38:897, 1969.

Type: Philippines. Luzon in neighborhood of Manila. Introduced in 1852 and cultivated by Veitch. Coll. Lobb s.n.! (K).

Syn.: *Phalaenopsis* × *intermedia* var. *Portei* Rchb.f. in Bot Zeit. 21:128, 1863.

Phalaenopsis × *Portei* (Rchb.f.) Denning in Gard. Chron. n.s. 5:370, 1876.

Phalaenopsis × *intermedia* var. *Porteana* Burb. in The Garden 22:119, 1882. *Sphalm.*

Phalaenopsis × *Porteri* Hort. ex Index Kew. 2: 486, 1895. *Sphalm.*

Type: Philippines. Luzon Island. Cult. Warner s.n.! (W).

Phalaenopsis delicata Rchb.f. in Gard. Chron. n.s. 17:700, 1882.

Type: Philippines. Luzon Island. Cult. Veitch 86! (W).

Phalaenopsis × *intermedia* var. *Vesta* Hort. in Orch. Rev. 1:52, 1893.

Phalaenopsis × *Vesta* (Hort.) Hort. in Gard. Chron. ser. 3, 13:80, 1893.

Type: Philippines. Cult. Veitch s.n.

Phalaenopsis × *intermedia* var. *Diezii* Covera in Phil. Orch. Rev. 5(2):9, 1953. *Nomen illegit.*

Phalaenopsis × *Diezii* (Covera) Quisumbing in Proc. Sec. World Orch. Conf. 31, 1958.

Type: Philippines. Leyte. Coll. and cult. Diez s.n.

Phalaenopsis Lobbii Hort. ex Rchb.f. in Bot. Zeit. 21:128, 1863. *Nomen.*

Phalaenopsis × *Aphroditi-equestris* Rchb.f. in Bot. Zeit. 21:128, 1863, *in nota.*

Phalaenopsis × *Brymeriana* Hort. ex Warner & Wms., Orch. Album 9: t. 416, 1890, *icon. tantum.*

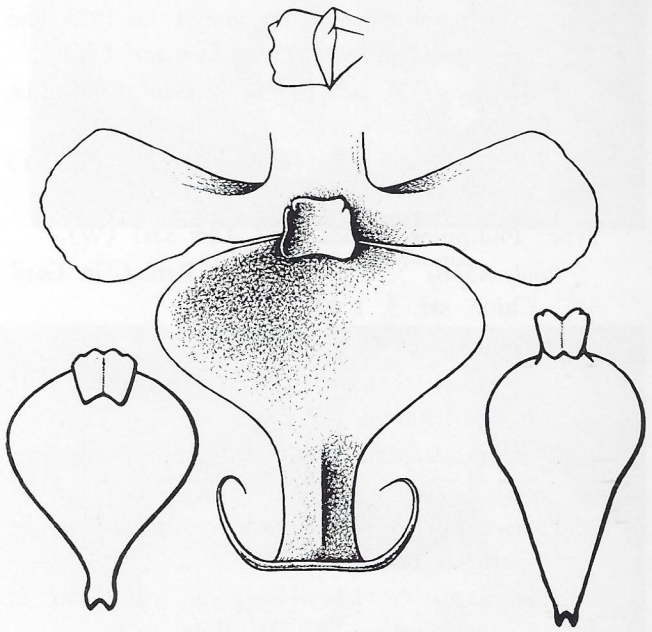
Phalaenopsis Aphrodite Rchb.f. × *P. equestris* (Schauer) Rchb.f.; epiphytic, plant variable in appearance, intermediate between the parents; roots very fleshy, flexuous, glabrous; stem short, few-leaved, completely enclosed by imbricating leaf-bases; leaves fleshy, arcuately pendulous, elliptic to oblong-elliptic, obtuse or rounded, green above, commonly purplish underneath, up to 30 cm. long and 7.5 cm. wide; inflorescence arcuate or pendent, simple or paniculate, purplish, many-flowered, up to 60 cm. long; bracts very small, triangular, up to 4 mm. long; flowers rather delicate in texture, variable in size and color ranging from white to deep rose; dorsal sepal elliptic or ovate-elliptic, obtuse or rounded, 2.5-4.0 cm. long, 1.0-1.5 cm. wide; lateral sepals obliquely ovate, acute or obtuse, 2.5-4.0 cm. long, 1.0-1.5 cm. wide; petals subrhomboid-elliptic, obtuse or rounded above, tapering to cuneate base, 2.0-3.5 cm. long, 1.5-2.2 cm. wide; lip unguiculate, 3-lobed; lateral lobes obovate-subspathulate; midlobe obovate to ovate-hastate in outline, gradually or abruptly tapering toward the tip where it is bidentate, bicuspidate or bicirrhous; at junction of lateral lobes and midlobe the disc is provided with a subquadrate callus; column slender, cylindric with a prominent rostellum; pedicellate ovary up to 3 cm. long.

Distribution: Endemic to Philippines: Luzon, Leyte and Visayan Islands.

PHILIPPINES. Luzon Island. Manila. Coll. Lobb s.n.! (K); Coll. Lyon s.n.! (AMES); Cult. Low s.n.! (W); Cult. Veitch s.n.! (W); Cult. Warner s.n.! (W); Cult. Veitch 86! (W).

Illustrations: Paxton, Fl. Gard. 3:163, fig. 310, 1853; Warner, Sel. Orch. Pl. 2: t. 2, 1865; Reichenbachia ser. 2, 2:5, t. 68, 1893; Katoh and Futakuchi, Orchids in Colour, pl. 113, fig. 6, 1974.

Observations: *Phalaenopsis intermedia* Lindl. is of historical importance for it was the first recognized hybrid among the tropical orchids. At the time when Lindley described it as a species in 1853, he surmised from the floral



Center: Outline of lip of *P.* × *intermedia*. Left: Outline of midlobe of lip of the form "Portei." Right: Outline of midlobe of lip of the form "delicata." Drawn from types.

characteristics its hybrid origin. Lindley's supposition was confirmed on April 8, 1886, when John Seden flowered artificial hybrids of the same parentage in the Veitch establishment (the seeds were sown in 1880). These artificial or man-made hybrids agreed fully with the plants and flowers collected in the wild.

Because of the hybrid nature of these plants, it is expected that individuals will vary to a great extent, verging in the direction of either of the parents. The several varietal names given to individual plants of this hybrid are only expressions of color intensity in the flowers, but they cannot be treated as botanical varieties because of their hybrid nature.

Phalaenopsis × *intermedia* var. *Brymeriana* as originally suggested by Reichenbach is a hybrid between *P. Schillerana* and *P. equestris*. This parentage is evident from the marmorated leaves. Consequently this trinomial is referable to *P.* × *Veitchiana.*

Phalaenopsis × *intermedia* var. *Diezii* of which I have examined living material in addition to the original illustration is only a teratological form approaching a true pelory. In that condition the petals become modified into the shape of the lip.

An examination of the type of *P.* × *delicata* has shown it to be identical with *P. intermedia.* Reichenbach himself noted this conclusion on the type sheet.

EXCLUDED VARIETY

Phalaenopsis × *intermedia* var. *Brymeriana* Rchb.f. in Gard. Chron. n.s. 5:366, 1876. See *P. Veitchiana* Rchb.f.

Phalaenopsis × leucorrhoda Rchb.f. in Gard. Chron. n.s. 3:301, 1875; Sweet in Amer. Orch. Soc. Bull. 38:899, 1969.

Type: Philippine Islands. Introduced in 1874 and flowered Feb. 19, 1875, by Low s.n.! (W).

Syn.: *Phalaenopsis* × *casta* Rchb.f. in Gard. Chron. n.s. 3:590, 1875.

Phalaenopsis × *leucorrhoda* var. *casta* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:46, 1891.

Type: Philippine Islands. Cult. Low s.n.! (W).

Phalaenopsis × *Rothschildiana* Rchb.f. in Gard. Chron. ser. 3, 1:606, 1887.

Type: Philippines. Cult. Veitch 389! (W).

Phalaenopsis × *leucorrhoda* var. *grandiflora* Hort. in Gard. Chron. n.s. 3:686, 1875, *in textu.*

Phalaenopsis casta Boxall ex Naves, Novis. App. 243, 1882. *Nomen.*

Phalaenopsis × *leucorrhoda* var. *alba* Hort. in Florist & Pom. 42, 1883.

Phalaenopsis × *leucorrhoda* var. *alba* Hort. in Gard. Chron. n.s. 20:751, 1883.

Phalaenopsis × Cynthia Rolfe in Gard. Chron. ser. 3, 7:132, 1890.

Phalaenopsis × *leucorrhoda* var. Cynthia (Rolfe) Veitch, Man. Orch. Pl. pt. 7: 46, 1891.

Phalaenopsis × *Youngii* Hort. in Gard. Chron. ser. 3, 15:211, 1894.

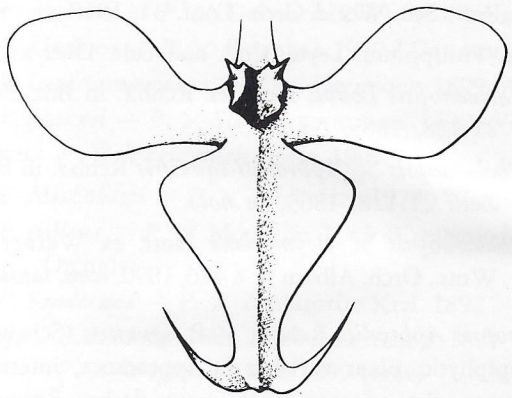
Phalaenopsis × *Youngiana* Hort. in The Garden 47:122, 1895.

Phalaenopsis × *Schillerano-gloriosa* Rolfe in Orch. Rev. 5:4, 1897.

Phalaenopsis × *casta* var. *superbissima* Hort. in Orch. Rev. 18:149, 1910.

Phalaenopsis × *Rothschildiana* var. *Tatsuta* Iwasaki in Orch. Rev. 32:258, 1924.

Phalaenopsis Aphrodite Rchb.f. × *P. Schillerana* Rchb.f.: epiphytic, stem short, completely enclosed by imbricating leaf-bases, 2- or 3-leaved; roots few, conspicuous, fleshy, somewhat compressed, lenticular in cross section, flexuous, glabrous; leaves variable in size and shape, arcuately pendent, green above with silvery grayish maculations, purplish underneath, elliptic to oblong-elliptic, acute or obtuse, gradually tapering to a conduplicate base, up to 32 cm. long and 8 cm. wide; inflorescence purplish, arcuately pendulous with a distinctly fractiflex rachis, many-flowered, up to 70 cm. long; bracts triangular-ovate, cucullate, scarious, up to 6 mm. long; flowers conspicuous, rather delicate in texture, variable in size and shape; dorsal sepal elliptic or narrowly elliptic to ovate, obtuse or rounded, 2.2-3.5 cm. long and 1.0-2.1 cm. wide; lateral sepals obliquely ovate or ovate-elliptic, acute, 2.2-3.5 cm. long and 1.0-2.1 cm. wide; petals semiorbicular-reniform to subrhombic, rounded above, gradually or abruptly tapering to cuneate base, 2.5-4.0 cm. long and 2.0-4.0 cm. wide; lip 3-lobed; lateral lobes spathulate; midlobe varies from sagittate-hastate to obovate, tapering toward the apex where it is provided with a pair of anchor-shaped appendages, or a pair of rather filiform cirrhi; between lateral lobes at base, but removed from junction with midlobe, there is a didymous, irregularly denticulate callus; length of whole lip 2.2-3.0 cm., width across expanded lateral lobes 2.5-3.5 cm.; column short, fleshy, cylindric; pedicellate ovary up to 4.0 cm. long.



Outline of lip of *P.* × *leucorrhoda.* Drawn from type.

Distribution: Philippine Islands, endemic on Luzon, Provinces of Rizal, Laguna and especially Tayabas.

PHILIPPINES. Island unknown. Cult. Low s.n.! (W); Coll. Roebelen s.n.! (W); Coll. Barber s.n.! (W); Cult. Low s.n.! (W); Cult. Veitch s.n.! (W); Cult. Bull 89! (W); Cult. Day s.n.! (AMES,K,W). Luzon, Monte de la Cuera de Montalhan. Coll. Loher 584! (US), 586! (K). Prov. Tayabas, Laguimanoc. Coll. Merrill 4018! (AMES); without precise locality. Coll. Lyon 54 bis! (AMES); Cult. Veitch 389! (K,W).

Illustrations: Floral Mag. n.s. 4: t. 166, 1875; Floral Mag. n.s. 6: t. 263, 1877 (as *P. intermedia* var. *Brymeriana* Rchb.f.); Cogn. & Gooss., Dict. Icon. Orch., Phalaenopsis Hybr. pl. 1, 1902; Orch. Rev. 13:231, 1905; ibid. 33:58, 1925.

Observations: This is an exceedingly variable hybrid. The sepals and petals may vary from pure white to rather heavy flush of pink or deep rose with white margins. Occasionally there are a few purplish dots at the base of the lateral sepals, very rarely with a greenish hue on back. The shape of the lip which is rarely truly intermediate between the parents, verges to that of either parent; color

Phalaenopsis Aphrodite.

Phalaenopsis Schillerana.

Phalaenopsis amabilis.

Phalaenopsis Sanderana.

Phalaenopsis Stuartiana.

Phalaenopsis Sanderana var. *alba.*

white with yellow and purple markings, dots or lines, rarely with a solid purple midlobe. The callus is commonly orange-yellow, very rarely a pale yellow or almost white, densely covered with maroon spots or dots.

Attached to the sheet of the type specimen of *P.* × *Rothschildiana* there is the original letter written by Harry Veitch with the following statement, ". . . by post today I send you [no.] 389 Phalaenopsis hybrid between P. Schilleriana × amabilis (Lindl.). The seed was sown in 1881. Of course Sedenian." Since *P. amabilis* Lindley is a synonym of *P. Aphrodite,* the parentage of this proposed hybrid is identical with *P.* × *leucorrhoda.* An examination of the actual specimens of this artificial cross in the Reichenbach Herbarium and in the Herbarium at the Royal Botanic Garden, Kew, England, clearly confirms that the original *P.* × *leucorrhoda* is truly a natural hybrid between *P. Aphrodite* and *P. Schillerana.*

An examination of the type specimen of *P.* × *casta* in the Reichenbach Herbarium, as well as the watercolors done by Reichenbach, and also the watercolor of this in the Day Collection in the Herbarium at the Royal Botanic Garden, Kew, England, leaves no question that *P. casta* is identical with *P.* × *leucorrhoda.*

Of all the natural hybrids reported in the genus Phalaenopsis, *P.* × *leucorrhoda* is the most variable, both in shape and color of the flowers.

Phalaenopsis × Veitchiana Rchb.f. in Gard. Chron. 935, 1872; Sweet in Amer. Orch. Soc. Bull. 38:900, 1969.

Syn.: *Phalaenopsis Veitchii* Hort. in The Garden 9:277, 1876. *Sphalm.*

Type: Philippine Islands. Luzon. Introduced and flowered in 1872 by Veitch 219! (W).

Phalaenopsis × *intermedia* var. *Brymeriana* Rchb.f. in Gard. Chron. n.s. 5:366, 1876.

Type: Philippines. Coll. Brymer s.n.! (W).

Phalaenopsis × *Veitchiana* var. *brachyodon* Rchb.f. in Gard. Chron. n.s. 21:270, 1884.

Type: Cult. Low s.n.! (W).

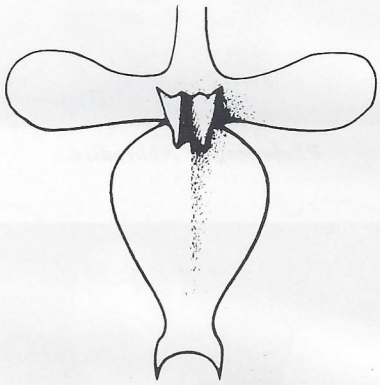
Phalaenopsis × *Gertrudeae* Quisumb. in Phil. Journ. Sci. 76:92, 1941. *pro. sp.*

Type: Philippine Islands. Luzon. Prov. Tayabas. Coll. Stewart s.n.! (AMES).

Phalaenopsis × *Virataii* Quisumb. in Phil. Orch. Rev. 6(2):4, 1956. *pro. sp.*

Type: Philippines. Luzon. Prov. Cavite. Coll. Virata s.n.! (PNH).

Phalaenopsis equestris (Schauer) Rchb.f. × *P. Schillerana* Rchb.f.: epiphytic, in general appearance very similar to some forms of *P. intermedia* Lindl.; leaves green with silvery maculations; inflorescence simple, racemose; flowers variable in size and color; dorsal sepal narrowly oblong-elliptic, acute or obtuse, up to 2.5 cm. long and 1.0 cm. wide; lateral sepals somewhat oblique, ovate, acute, up to 2.5 cm. long and 1.0 cm. wide; petals subrhombic or narrowly subrhombic-elliptic, rarely 4-angled, obtuse or rounded, occasionally retuse, tapering to a cuneate base, up to 2.5 cm. long and 1.5 cm. wide; lip 3-lobed; lateral lobes obovate-spathulate; midlobe obovate to obovate-subrhombic, tapering gradually or abruptly to a bidentate tip; disc between lateral lobes at junction of midlobe is provided with a fleshy conduplicate subquadrate callus; length of whole lip 2 cm., width across lateral lobes 2.5 cm.; column cylindric; pedicellate ovaries to 4 cm. long.



Outline of lip of *P.* × *Veitchiana.* Drawn from type.

Distribution: Endemic to Philippine Islands: Luzon. PHILIPPINES. Cult. Veitch 219! (W); Coll. Lyon s.n.! (AMES); Coll. Brymer s.n.! (W); Cult. Low s.n.! (W). Luzon Island. Prov. Tayabas. Coll. Stewart s.n.! (AMES); Coll. Loher s.n.! (AMES); Coll. Boxall s.n. (W). Prov. Cavite. Coll. Virata s.n.! (PNH).

Illustration: Floral Mag. n.s. t. 213, 1876.

Observations: *Phalaenopsis* × *Veitchiana* first appeared as a solitary specimen among one of Messrs. Veitch's importations prior to 1872, in which year it flowered for the first time. This putative natural hybrid was confirmed in 1896 by an artificial cross produced by Messrs. Heath & Son. Reichenbach (Gard. Chron. 935, 1872) previously had suspected it to be a natural hybrid between *P. equestris* and *P. Schillerana,* and offers the following notes: "The leaves look like those of an exceedingly pale marked P. Schilleriana; it is best to have oblique light, in order to recognize the marking. The roots are flat, light green, the tips lighter green, and inclined to be round, not flat as in Schilleriana. The flower spike is small, round, red, much like that of P. equestris (rosea), but longer, and flowers not so close together as in P. equestris (rosea). The flowers are much like those of P. Schilleriana, but smaller, purplish, with whitish margins to the sepals and petals, the lip being purplish white only with dark purplish spots at the bases of the lateral partitions, and the callus yellow, with brownish spots. The anterior teeth of the lip are straight, not arched, nor tendril-like."

After giving details of the flowers he remarked, "I feel happy to dedicate this very great curiosity to Harry J. Veitch, Esq., whose zeal for the introduction of rare and new plants appears to increase from year to year."

The above-named plant was the only one until 1883, when a second was imported by Messrs. Low & Co. This differed little and Reichenbach gave it the varietal name *brachyodon* (Gard. Chron. 271, 1884) because of the stoutness of the apical teeth of the front lobe of the lip.

Quisumbing in the Philippine Journal of Science 77:15, 1947 suggests that *P.* × *Gertrudeae* Quisumb. should be compared with *P.* × *Veitchiana* for he had not seen the type of the latter. I have examined the type specimen of *P.* × *Veitchiana* and the flower of the type of *P.* × *Gertrudeae* preserved in alcohol in the collections of the Orchid Herbarium of Oakes Ames. My study shows that indeed we are dealing with one and the same hybrid.

Phalaenopsis × *Virataii* is nothing more than the reciprocal cross of *P.* × *Veitchiana.* Nomenclatorially reciprocal crosses cannot receive new names.

☆ ☆ ☆

Section **PROBOSCIDIOIDES** Rolfe in Gard. Chron. n.s. 26:276, 1886; Sweet in Amer. Orch. Soc. Bull. 37:872, 1968; *ibid.* 38:237, 1969.

Petals broader than sepals; midlobe of lip entire, without apical appendages; column with a long proboscis-like extension to the rostellum which resembles an elephant's head and trunk.

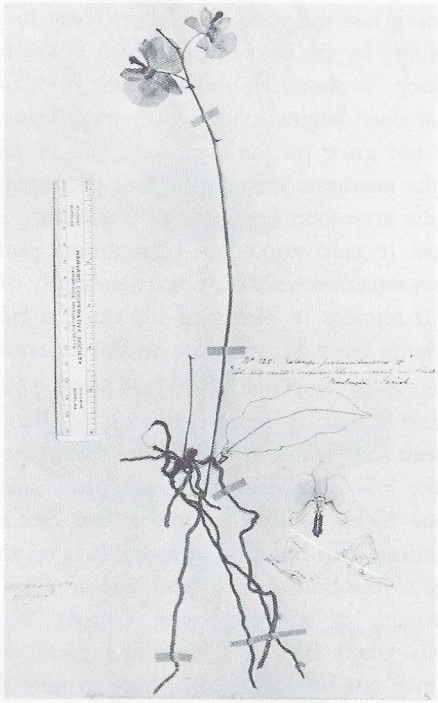
Type: *Phalaenopsis Lowii* Rchb.f.

Phalaenopsis Lowii Rchb.f. in Bot. Zeit. 20:214, 1862; Sweet in Amer. Orch. Soc. Bull. 38:238, 1969.

Syn.: *Phalaenopsis proboscidioides* Parish ex Rchb.f., Xenia Orchidacea 2:139, 1868, *nomen.*

Type: Burma: Moulmein. Coll. Parish 125! (W).

Epiphytic; roots few, elongate, fleshy, flexuous, glabrous; stem much abbreviated, completely enclosed by imbricating leaf sheaths; leaves one to five, articulate, persistent or deciduous, dark green above, speckled with purple underneath, ovate-lanceolate to oblong-lanceolate, acute, canaliculate above, up to 9 cm. long, to 3 cm. wide; inflorescence slender, arcuate or pendent, racemose, occasionally paniculate, loosely many-flowered, up to 30 cm. long; bracts triangular, acute, 3-4 mm. long; flowers delicate in texture, large and conspicuous; dorsal sepal oblong-elliptic to ovate-elliptic, acute or subobtuse, 15-20 mm. long, 9-12 mm. wide; lateral sepals obliquely ovate or ovate-elliptic, acute or subobtuse, 15-20 mm. long, 9-12 mm. wide; petals from cuneate base flabellate-reniform or flabellate-suborbicular, broadly rounded above, 17-22 mm. long, 18-24 mm. wide; lip 3-lobed; lateral lobes falcate-hamate provided with an elevated fleshy ridge running diagonally across disc; midlobe originating in center from underneath lateral lobes, from a cuneate base ovate or flabellate-ovate, convex, acute or rounded in front, occasionally shortly apiculate, the margin irregular, sometimes denticulate; disc provided with well-developed, fleshy, longitudinal keel running down entire length in center; disc between lateral lobes is provided with a pair of fleshy, approximate, lamella-like callosities in front of which there is a fleshy, sulcate, bilobed callus projecting over the midlobe; length of whole lip 15 mm., width across lateral lobes 10 mm.; column short, fleshy, arcuate, apically provided with a long proboscis-like extension, 8 mm. long; rostellum biacicular, as long as column; pedicellate ovary up to 4 cm. long.



Photograph of type collection of *P. Lowii* in the Lindley Herbarium.

Distribution: Burma: Moulmein.

BURMA. Moulmein. Coll. Parish 125! (K,W); Cult. Day s.n.! (W); Cult. Williams s.n.! (K); Cult. Hort. Kew s.n.! (K,W); Cult. in 1904 Hort. Langwater s.n.! (AMES).

Illustrations: Bot. Mag. 88: t. 5351, 1862; Lindenia 6: t. 272, 1891; Amer. Orch. Soc. Bull. 38:239, 1969.

Observations: The Rev. C. S. Parish while travelling in Moulmein discovered this species. It was introduced into cultivation in England by Messrs. Low & Co. in 1862. The flowers white, sepals and petals with a faint flush of amethyst-purple on the basal halves. The lip is 3-lobed. The side or lateral lobes are erect and resemble two incurved horn-like bodies that are white with a yellow spot. The midlobe, as well as the proboscis-like apex of the column is a deep carmine-rose to deep purple.

Although Parish originally suggested the name *P. proboscidioides* for this species because of the elongated apex of the column which reminded him of an elephant's head and trunk, this name was not known to Reichenbach until after he had described the species as *P. Lowii.* It has also been called the "Beak orchid."

E. S. Berkeley (Gard. Chron. ser. 3, 1:279, 1887) offers the following on its ecology: "The plant loses all its leaves in its native habitat directly after flowering. . . . The ranges of limestone hills on which it grows rise suddenly out of the delta of the rivers Gyne, Ataran, and Salween, Tennasserim, Burmah. The country surrounding these hills is under water the greater part of the year, and the rainfall excessive. By the end of November the country dries up, and on January 1 both flower-stems and leaves have dried up, nothing remaining but the roots. The roots cease to grow, but are kept plump by the heavy dews which fall at night. The resting season is short, as showers fall in March, when the plant at once begins to put forth fresh leaves . . . the plant does not grow on the southwest side of the hills; it grows on the northeast side, and is thus protected from the effects of the afternoon heat of a tropical sun. . . . It likes a little moss in cultivation, but cannot bear peat. During the rainy season it receives an immense supply of water at the roots. It rejoices in plenty of light and a fair amount of sun, as large trees do not grow on the limestone rocks."

Moreover, Berkeley (Orch. Rev. 1:242-243, 1893) writes, "Phalaenopsis Lowii is found growing in the low-lying country about sixty miles up the Ghine river, east of Moulmein. In the low river delta there are many small groups of limestone rocks, sometimes only a few feet above the plain, sometimes two hundred or more. It is on these rocks or clinging to the bushes that grow out of them that this plant is found, in company with Doritis Wightii. As Phalaenopsis Lowii is such a charming plant, when well grown, it may not be out of place here to note that really strong plants of it are not deciduous in favourable positions in its native habitat, and therefore such plants should not be allowed to become deciduous in our English houses. With careful attention plants of this and also P. Parishii cease to be deciduous, and get sufficiently strong to retain their leaves all the year round. Although rather troublesome to train the plant into sufficient strength, the trouble is well repaid by the production of strong instead of weak flower-spikes. In Moulmein I have seen spikes quite three feet long, with many side branches, and at least a hundred flowers out at one time. When grown thus it is a difficult plant to beat. Flowering, as it does, in October, when most people are in their country houses, it is well worth the attention of the gardener; a really well-grown plant could not fail to be appreciated.

"I may explain, for the benefit of gardeners and growers of these so-called deciduous Phalaenopses, that the season during which they are at rest in the jungle, and lose their leaves, is very short. On the equator the rains only cease for about a month, and 15° N. of it only about two months, so that growth recommences after a very short rest. If rested and allowed to become deciduous in our English houses, the resting season becomes much too long, the plant gets weaker and weaker and never does any good. I have now plants which have been eight years in England which retain their leaves all the winter, and are growing very strongly, and these always lose their leaves the first few seasons. My method is simply to keep the moss round the roots alive in the winter, which allows of sufficient moisture to prevent the leaves from drying up."

Phalaenopsis Lowii **redrawn and modified from Bateman's Second Century of Orchidaceous Plants, t. 168, 1867.**

In its deciduous habit this species may be a connecting link between the members of this section *Aphyllae* and those in the section *Parishianae.*

This species is not in cultivation at present.

☆ ☆ ☆

Section **APHYLLAE** Sweet in Amer. Orch. Soc. Bull. 37: 872, 1968; *ibid.* 38:233, 1969.

Stem abbreviated, leaves few, bract-like, deciduous; inflorescence one- to many-flowered; sepals and petals narrow, similar; midlobe of lip convex above, canaliculate below, with more or less involute margins.

Type: *Phalaenopsis Stobartiana* Rchb.f.

KEY TO THE SPECIES

1. Midlobe of lip bilobed at apex; disc at apex with fleshy, ovoid callus.....**P. Wilsoni**

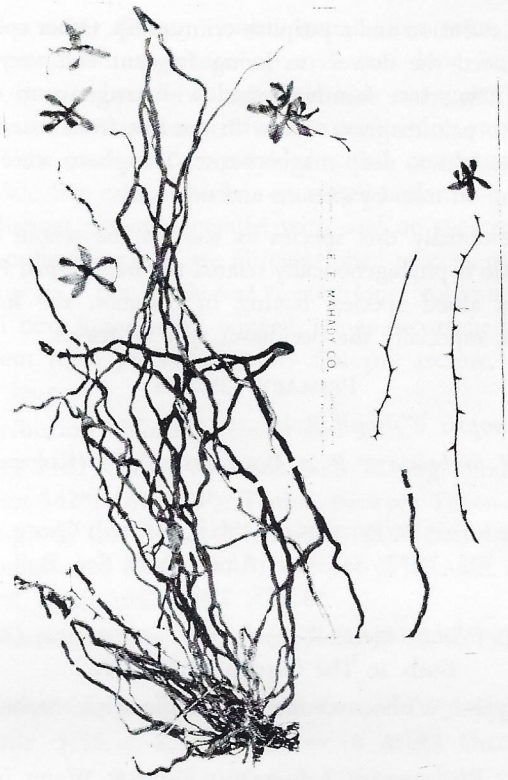
1a. Midlobe of lip entire at apex; disc with median longitudinal keel.....**P. Stobartiana**

ENUMERATION OF SPECIES

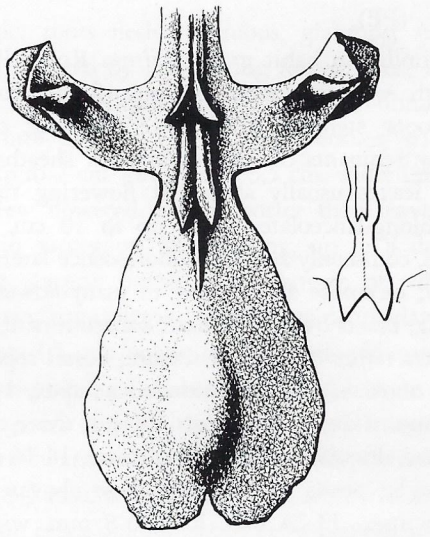
Phalaenopsis Wilsonii Rolfe in Kew Bull. 65, 1909; Sweet in Amer. Orch. Soc. Bull. 38:234, 1969.

Type: Western China, without precise locality. Coll. Wilson 4576! (K).

Epiphytic: roots copious, extensive, well-developed, fasciculate, fleshy, compressed, glabrous, chlorophyll-bearing; stems very short, reduced in length to less than 1 cm.; leaves usually absent at flowering, commonly reduced, bract-like, articulate with leaf sheaths, when present, oblong-elliptic, acute, up to 2.5 cm. long, 9 mm. wide; inflorescence lateral, quite variable in length, arcuate to pendent, straight or slightly fractiflex, very slender, few-flowered, up to 20 cm. long, commonly much shorter; bracts ovate, cucullate, acute, up to 8 mm. long; flowers rather delicate in texture, remote, one to three in a raceme; dorsal sepal oblong-elliptic, acute or subobtuse, 18-22 mm. long; 6-8 mm. wide; lateral sepals oblique, similar to dorsal sepal in shape and size, acute; petals elliptic to oblong-ovate, obtuse or rounded, 15-21 mm. long, 6-9 mm. wide; lip 3-lobed, prominently clawed; lateral lobes falcate-oblong, distinctly folded at apex, below which there is a fleshy callus; midlobe from a cuneate base, ovate, distinctly bilobed at apex, disc with an incrassate ovoid callus in center, disc between the lateral lobes with a pair of superimposed callosities, the basal one grooved in the middle and forked in front, the anterior one at the junction of the midlobe and lateral lobes, rhomboid, bilobed in front, canaliculate in middle, occasionally the two sets of calli are confluent into one; length of whole lip 12-20 mm.; width across lateral lobes 12-14 mm.; column fleshy, erect, sub-cylindric with large stigmatic cavity 1 cm. long; pedicellate ovary up to 4 cm. long.



Holotype of *P. Wilsonii* at Kew.



Lip of *P. Wilsonii.* Drawn from type.

Distribution: China: Szechuan, Yunnan; East Tibet. CHINA: western part. Coll. Wilson 4576! (K). Yunnan. Coll. Forrest 26706! (AMES,NY), 23022! (K,US), 19826! (K,P,US). Chien-chuan Mekong divide. Coll. Forrest 23529! (K,P,US,W). Likiang Snow Range, Yangtze watershed. Coll. Rock 8550! (AMES,US); Coll. Forrest 13031! (E). Mekong-Tal. Coll. Gebauer, s.n.! (W). Szechuan, Wen Chuan. Coll. Limpricht 1417! (K). East of Moochon. Coll. Wilson 1770! (AMES). TIBET: southeast part. Coll. Forrest 19129! (K).

Observations: This somewhat variable species is described by Wilson as having pink sepals and petals with

purple suffusion and a purplish crimson lip. Other collectors have noted the flowers as being fragrant and varying in color from white faintly flushed with magenta to creamy white to pale magenta-rose with the lips from rose-lake to magenta-lake to deep magenta-rose. The plants were found growing on trees by streams and on rocks.

Undoubtedly this species as well as the whole section *Aphyllae* is phylogenetically related to *Phalaenopsis Parishii* and its allied species, having in common the habit of growth, especially the deciduous type of leaves.

PRIMARY CROSSES

Phalaenopsis Wilsonii Rolfe

× *P. fimbriata* = *P.* × Bomantoro. 1979 (Kolopaking)

Phalaenopsis Stobartiana Rchb.f. in Gard. Chron. n.s. 8: 392, 1877; Sweet in Amer. Orch. Soc. Bull. 38:235, 1969.

Syn.: *Phalaenopsis Wightii* var. *Stobartiana* (Rchb.f.) Burb. in The Garden 22:19, 1882.

Type: Without country of origin. Cult. Stobart s.n.! (W).

Phalaenopsis hainanensis Tang & Wang in Acta Phytotaxonomica Sinica 12:47-48, 1974.

Type: China, Hainan, Pai Sha district. Lau 27549! (PE).

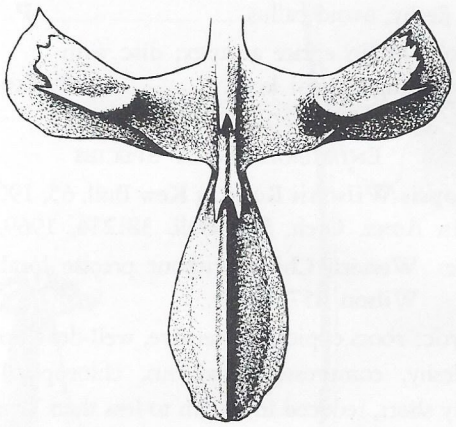
Plants similar in habit to *P. Wilsoni* Rolfe. Plants epiphytic with well-developed, copious, fleshy, compressed, glabrous roots; stem short, up to 2 cm. long, completely enclosed by remnants of imbricating leaf sheaths, up to 2 cm. long; leaves usually absent at flowering time, when present, oblong-lanceolate, acute, up to 10 cm. long and 5 cm. wide, commonly smaller; inflorescence lateral, arcuate or pendent, racemose above, few- to many-flowered, up to 20 cm. long; bracts ovate, cucullate, subacuminate, to 5 mm. long; flowers rather delicate in texture; dorsal sepal oblong-elliptic to obovate, acute or rounded at apex, 14-15 mm. long, 4-7 mm. wide; lateral sepals oblique, ovate or elliptic-ovate, obtuse, dorsally indistinctly carinate, 14-16 mm. long, 6-7 mm. wide; petals from cuneate base obovate, acute or rounded at apex, 11-14 mm. long, 6-8 mm. wide; lip 3-lobed; lateral lobes oblong-ligulate, subfalcate, somewhat constricted in middle with distinct callus extending toward apex, in plate-like manner, terminating in an irregularly denticulate apex, midlobe very fleshy, convex above, excavate below, with small fleshy ridge running full length down the middle, the margins folded under, the disc between lateral lobes with a pair of superimposed, fleshy, linear, bifid calli; length of whole lip 8-11 mm.; width across lateral lobes 10-12 mm.; column rather short, fleshy, cylindric, somewhat arcuate, to 6 mm. long; pedicellate ovary to 1.5 cm. long.

Distribution: China, Hainan; Burma.

CHINA: Hainan, Pai Sha district. Coll. Lau 27549! (AMES, PE). Country of origin unknown. Cult. Stobart s.n.! (W). BURMA: Patkai range near Indian border. Haase s.n.! (AMES).

Illustration: Amer. Orch. Soc. Bull. 38:236, 1969.

Observations: Reichenbach (Gard. Chron. n.s., 8:392, 1877) offers the following comments: "Sepals and petals of a beautiful apple-green colour, ultimately yellowish green. Lip with the lateral partitions white with yellow and amethyst coloured, the middle lobe totally amethyst coloured. This bright amethyst colour finally changes into a nearly cinnabarine red. The base of the white column is also amethyst coloured. I had a branch or top of inflorescence with eight flowers, a little smaller than those of P. equestris (rosea). . . . It is dedicated to its possessor, Mr. William C. Stobart. . . ."



Lip of *P. Stobartiana*. Drawn from type.

Since the specimens from Hainan and Burma have rose or mauve flowers with a deeper shade in the lip, the green sepals described by Reichenbach quite possibly were due to cultural conditions.

Although the place of origin remained unknown, I was able to identify a specimen of this species in the Orchid Herbarium of Oakes Ames, which was collected in China by S. K. Lau no. 27549 (AMES). The collector states that this species grows in dense woods and flowers in July. This collection in 1974 was made the type of *P. hainanensis.*

Peter Haase (Austral. Orch. Rev. 40:72, 1975) gives some ecological observations: "Warm zone (less than 100 m. elevation) of the spurs of the Patkoi-range growing on branches 25 to 50 mm. diameter and more, which are overhanging small streamlets. Branches have very smooth bark. Streamlets have water all through the year. Plants grow in a very limited ecological niche."

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Section **PARISHIANAE** Sweet in Amer. Orch. Soc. Bull. 37:872, 1968; *ibid.* 38:321, 1969.

Syn.: *Grafia* Hawkes in Phytologia 13:305, 1966. (Not Reichenbach. 1837.)

Leaves well-developed, often deciduous; inflorescence short and few-flowered; sepals and petals similar in shape, roundish; claw of lip adnate to column-foot at a right angle; midlobe of lip mobile.

Type: *Phalaenopsis Parishii* Rchb.f.

KEY TO THE SPECIES

1. Inflorescence much surpassing the leaves; rachis fractiflex, loosely several-flowered.....**P. gibbosa**

1a. Inflorescence as long as or shorter than the leaves; rachis not fractiflex, loosely to subdensely few-flowered 2

2. Sepals 6-8 mm. long; midlobe of lip triangular-reniform in outline, truncate at base 3

2a. Sepals up to 4 mm. long; midlobe of lip from a cuneate base triangular, truncate in front .....**P. appendiculata**

3. Inflorescence arcuate with a sinuous rachis; midlobe of lip with a transverse plate at base.....4

3a. Inflorescence stiffly erect with a straight rachis; midlobe of lip without a plate at base.....**P. mysorensis**

4. Midlobe of lip purple-violet, basally provided with a semicircular, rather thin, prominently fringed plate .....**P. Parishii**

4a. Midlobe of lip white with a pair of rather large vertical, chestnut-brown or rusty-brown bands, basally provided with a reniform, tumid plate which is obscurely denticulate along margins .....**P. Lobbii**

ENUMERATION OF SPECIES

Phalaenopsis gibbosa Sweet in Amer. Orch. Soc. Bull. 39:1095, 1970.

Type: North Vietnam (Tonkin): Prov. Hoa Binh, Muong Thon, epiphyte in open forest, March 1933. Coll. A. Petelot 5425! (AMES).

Epiphytic; roots copious, fleshy, long, flexuous, glabrous; stem moderately developed, completely enclosed by distichous imbricating leaf bases; leaves fleshy, from a cuneate base, elliptic to obovate-elliptic, acute, up to 12 cm. long, and 4.5 cm. wide, usually smaller. Inflorescence rather slender, erect or arcuate, much surpassing the leaves, racemose or paniculate, up to 15 cm. long, peduncle terete, with one or two remote sheaths, comprising half of the inflorescence; rachis complanate, fractiflex, remotely several-flowered; bracts alternate, distichous, ovate, cucullate, acute, much shorter than the pedicellate ovaries, up to 4 mm. long; flowers rather delicate in texture, with widely spreading or reflexed segments, from dried material appear to be cream or white in color; dorsal sepal ovate, cucullate, acute, up to 7 mm. long and 3.5 mm. wide; lateral sepals obliquely ovate to ovate-elliptic, acute, laterally adnate to column-foot, up to 6 mm. long and 4.5 mm. wide; petals narrowly ovate to ovate-elliptic, obtuse, up to 5 mm. long and 3 mm. wide; lip rather fleshy, 3-lobed; lateral lobes erect, linear falcate-triangular, acuminate, up to 2 mm. long; midlobe mobile, from a broadly subquadrate base triangular, acute in front, truncate at base with obtuse angles, disc at base in front of the quadrate part provided with a crescent-shaped denticulate free callus which is excavated underneath forming a distinct gibbosity parallel with, and on the crescent-shaped callus there is a free filiform, lobed process, midlobe of lip up to 7 mm. wide and 6 mm. long; column short, up to 4 mm. long, fleshy, winged, wings decurrent on the prominent foot; pedicellate ovary filiform, arcuate, up to 4 mm. long.

Distribution: North Vietnam and Laos.

NORTH VIETNAM: Prov. Hoa Binh, Muong Thon. Coll. A. Petelot 5425! (AMES,P); Tonkin, between Tuyen-quang and Ha-giang. Coll. Rives 2 (P). SOUTH VIETNAM. Between Saigon and Dalat. Coll. Tixier 16! (P). LAOS. Dankgap. Coll. Spire 1082! (P).

Illustration: Amer. Orch. Soc. Bull. 39:1096, 1970.

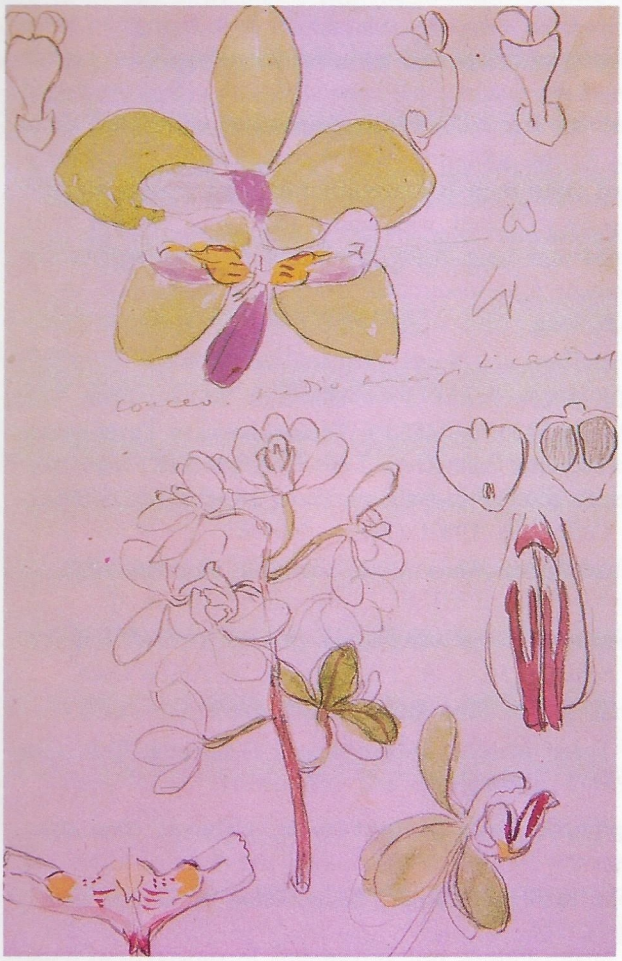
Phalaenopsis appendiculata C. E. Carr in Gard. Bull. Str. Settle. 5:16, t. 8, 1929; Sweet in Amer. Orch. Soc. Bull. 38:324, 1969.

Type: Malaya: Pahang State, Tembeling. Coll. Carr 299! (K).

Epiphytic; roots fleshy, flexuous, glabrous; stem short, completely covered by imbricating leaf sheaths; leaves 3-4, elliptic to oblong-elliptic, fleshy, acute or obtuse, basally produced into distinct 5 mm. long petioles, with petiole included up to 7 cm. long, up to 3.5 cm. wide; inflorescence suberect, few flowered, much shorter than leaves; flowers produced in succession, long lasting, up to 8 days, rather delicate in texture; dorsal sepal obovate or suborbicular, strongly cucullate-concave with erose-denticulate margin, 4 mm. long, 3.5 mm. wide; lateral sepals obliquely broadly ovate or subrotund, somewhat concave, obtuse or subobtuse, 5 mm. long, 4.5 mm. wide; petals from a broadly cuneate base suborbicular with a round erose-denticulate apex, 4 mm. long, 3.5 mm. wide; lip 3-lobed; lateral lobes adnate to column-foot, erect, oblong-linear, erose-dentate at apex with distinct longitudinal keel produced into an acute tooth in middle; midlobe mobile, triangular-subdeltoid, subtruncate or subtriangular in front, the margin of which is obscurely erose-dentate; disc provided in basal half with four digitate-lacerate projections; at junction of midlobe and lateral lobes a pair of superimposed, ligulate, bifurcate projections, the anterior of which is longer with aristate tips; midlobe 5.5 mm. long, 7.5 mm. wide; column short, broad, fleshy; pedicellate ovary 5 mm. long.

Distribution: Malaya, Pahang State, Tembeling.

MALAYA. Pahang State, Tembeling. Coll. Carr 229! (K); Coll. Henderson 21865! (K,NY).



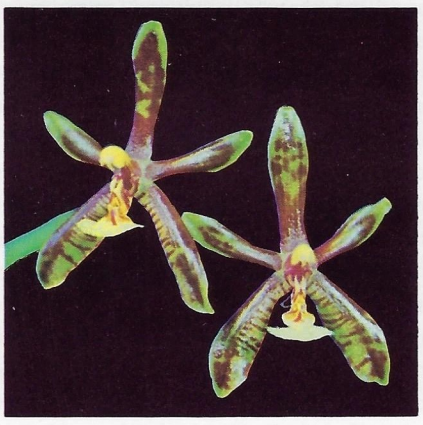
Copy of Reichenbach's original watercolor of *P. Stobartiana.*

Copy of watercolor of *P. Parishii* from Day Collection at Kew.

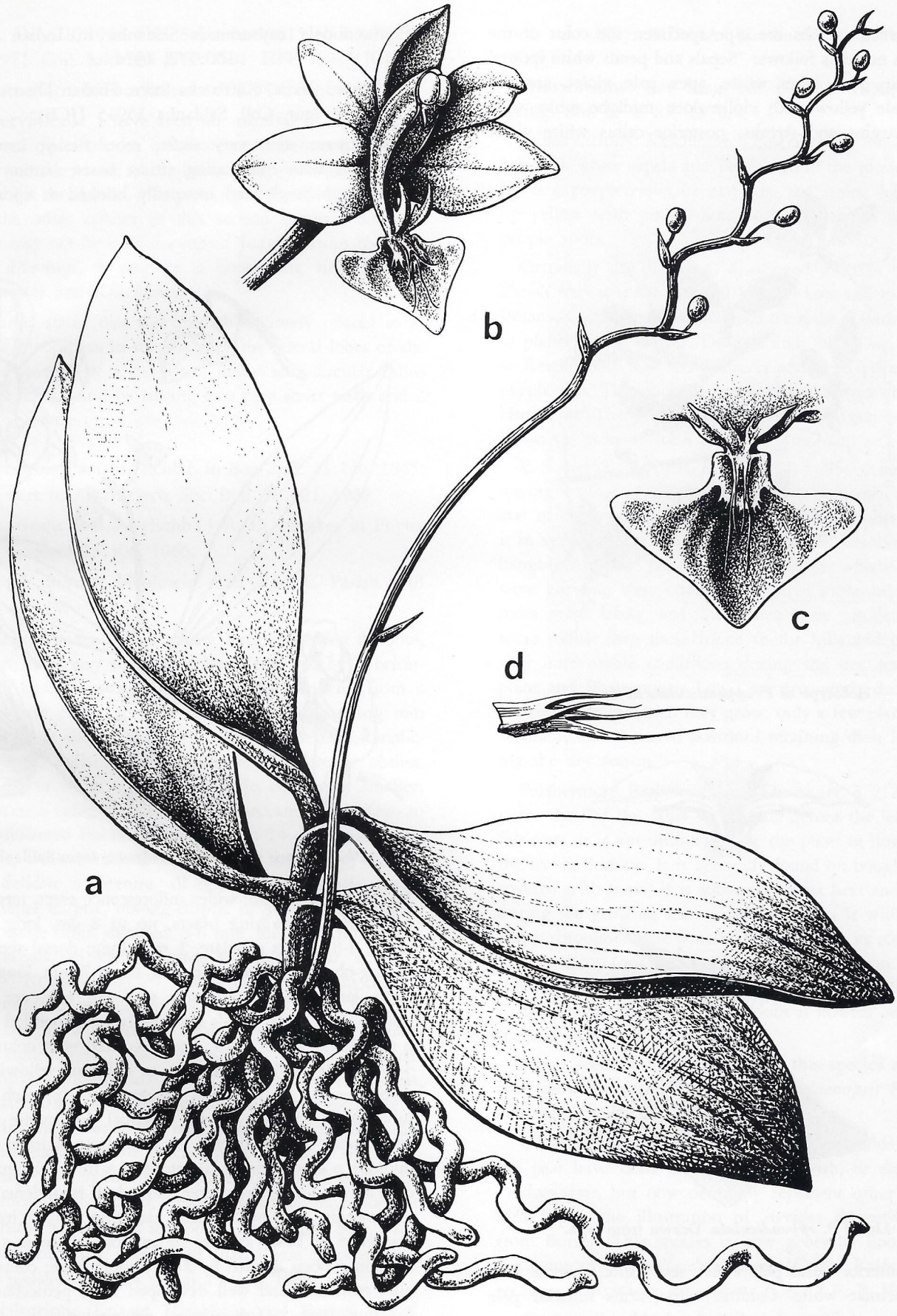
Phalaenopsis Lobbii.

Phalaenopsis cornu-cervi.

Phalaenopsis cornu-cervi var. *picta.*



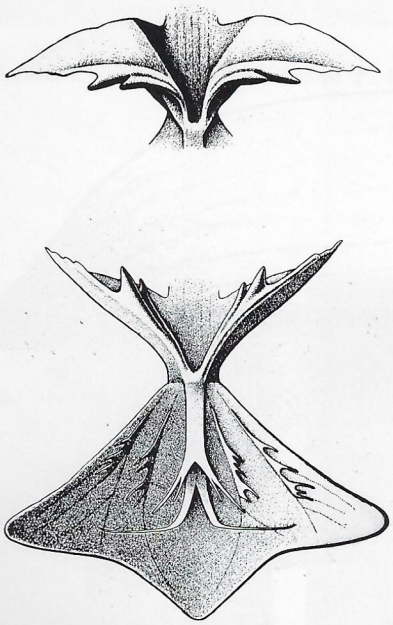
Phalaenopsis Mannii.



Phalaenopsis gibbosa Sweet. a. Plant with inflorescence. b. Flower. c. Lip from above. d. Side view of free labial process.

Observations: On the type specimen the color of the flowers is noted as follows: "Sepals and petals white spotted violet. Lip, side lobes white, apex pale violet, anterior lobule pale yellow with violet dots; midlobe white with violet margins and streaks; posterior callus white violet

Holotype of *P. appendiculata* at Kew.



Lip of *P. appendiculata*. Drawn from type.

dotted; anterior callus pale violet, seta white; exterior calli violet, laciniae white. Column white, arms suffused pale violet, apex of foot pale yellow bordered pale violet."

This species has been collected only twice, on both occasions in the type locality.

Phalaenopsis mysorensis Saldanha in Indian Forester 100:572, 1974.

Type: India, Karnataka State, Hassan District, Vanagur. Coll. Saldanha 15915 (JCB).

Epiphytes; stem very short; roots fleshy; leaves subdistichous with imbricating striate bases; lamina elliptic-obovate, shallowly and unequally bilobed at apex, up to

***Phalaenopsis mysorensis*. Redrawn from Saldanha.**

14 cm. long, 3.5 cm. wide; inflorescence erect, terete, with 1-2 scarious sheathing bracts, up to 8 cm. long; flowers white, 4-8; bracts subulate, 1 mm. long; dorsal sepal erect, oblong-obovate, rounded at apex, up to 7 mm. long, 4 mm. wide; lateral sepals obliquely subovate, subacute, 6 mm. long, 5 mm. wide; petals oblong-obovate, rounded at apex, 6 mm. long, 3 mm. wide; lip articulated with column-foot, 3-lobed; lateral lobes parallel to column, yellowish, suboblong, erose, oblique and incurved at tip, each with a subterminal foramen having unequal denticulate margins and a small orange, curved lobule at base of inner margin; midlobe porrect, triangular-reniform with a triangular concave depression in the center marked off by indentations on the margin and by 2 faint radiating ridges irregularly thickened at base; at base of midlobe there is a forked, filiform process flanked by 2 very short teeth; column with bifid rostellum and well developed foot; pedicellate ovary 6-7 mm. long. (After original description.)

Distribution: India, Mysore.

INDIA: Karnataka State, Hassan District, Vanagur. Alt.

900 m., Dec. 18, 1969. Coll. Saldanha 18915 (JCB), April/ May 1971. Coll. Saldanha HFP 1581, HFP 1692 (JCB).

Illustration: Indian Forester 100:570, Sept. 1974.

Observations: I have seen no material of this species. The description of the inflorescence, the lateral lobes of the lip and the nature of the bifurcate appendage are rather atypical for the section. Moreover, the geographical isolation from the other species in this section suggests that this species may not be a *Phalaenopsis.* Judging from the published drawings, it may be a connecting link between *Phalaenopsis* and *Kingidium.*

Saldanha states that this species is closely related to *P. Parishii,* but differs in the shape of the lateral lobes of the lip, the absence of a fimbriate, fleshy semi-circular callus on the midlobe and by having two very short teeth and 2 longer antennae.

Phalaenopsis Parishii Rchb.f. in Bot. Zeit. 23:146, 1865; Sweet in Amer. Orch. Soc. Bull. 38:321, 1969.

Syn.: *Grafia Parishii* (Rchb.f.) A. D. Hawkes in Phytologia 13:306, 1966.

Type: Burma: Moulmein. Coll. Rev. C. Parish 110! (W).

Epiphytic; roots copious, fleshy, long, somewhat flexuous, glabrous; stem very short, completely enclosed by imbricating leaf bases; leaves fleshy, arcuate or pendent, from a cuneate base either abruptly or gradually expanding into an obovate or elliptic blade, at times asymmetrical, canaliculate above, indistinctly carinate below, acute or obtuse, up to 12 cm. long, up to 5 cm. wide, commonly smaller; inflorescence rather slender, erect or arcuate, with a few- to several-flowered fractiflex rachis, up to 14 cm. long; bracts alternate, ovate-cucullate, acute, to 3 mm. long; flowers rather delicate in texture, all open simultaneously, small; dorsal sepal elliptic, oblong-elliptic or subrotund, acute or obtuse, quite often rounded, 6-8 mm. long, 3-5 mm. wide; lateral sepals obliquely obovate to suborbicular, acute or obtuse, 7-10 mm. long, 5-7 mm. wide; petals from cuneate base obovate or obovate-elliptic, obtuse, 6-8 mm. long, 3-4 mm. wide; lip with distinct short claw adnate to column-foot at right angle, 3-lobed; lateral lobes porrect, triangular with distinct longitudinal fleshy keel; midlobe movable, triangular-auriculate in outline, somewhat convex, acute to obtuse in front, basally provided with a semicircular, rather thin plate, the margin of which is dissolved in a long prominent fringe, at junction of midlobe and lateral lobes there is a lamella-like, bilobed, fleshy projection, each lobe in turn bifurcates, length of midlobe 4-7 mm., 5-10 mm. wide; column short, fleshy, with broad dilated base decurrent into a foot; pedicellate ovary up to 15 mm. long.

Distribution: Eastern Himalayas and Burma (Moulmein).

EASTERN HIMALAYAS. Without precise locality. Coll. Bull. s.n.! (W). BURMA. Moulmein. Coll. Parish 110! (K,W).

Illustrations: Bot. Mag. 96: t. 5815, 1870; Saunders, Refug. Bot. 2: t. 85, 1870.

Observations: Reichenbach describes the flowers as having milk-white sepals and petals, while the midlobe of the lip is a purple-violet or magenta, the lateral lobes of the lip yellow with purple dots and the column white with purple spots.

Originally the plant was discovered in 1864 by Rev. C. Parish who sent the material both to Low and to the Royal Botanic Garden at Kew. Material from these sources, as well as plants grown by Mr. Dawson and John Day, were sent to Reichenbach for identification and description. All had purple lips. This form is known from Burma and Eastern Himalayas. The plate in the Botanical Magazine depicts a flowering plant of John Day of Tottenham.

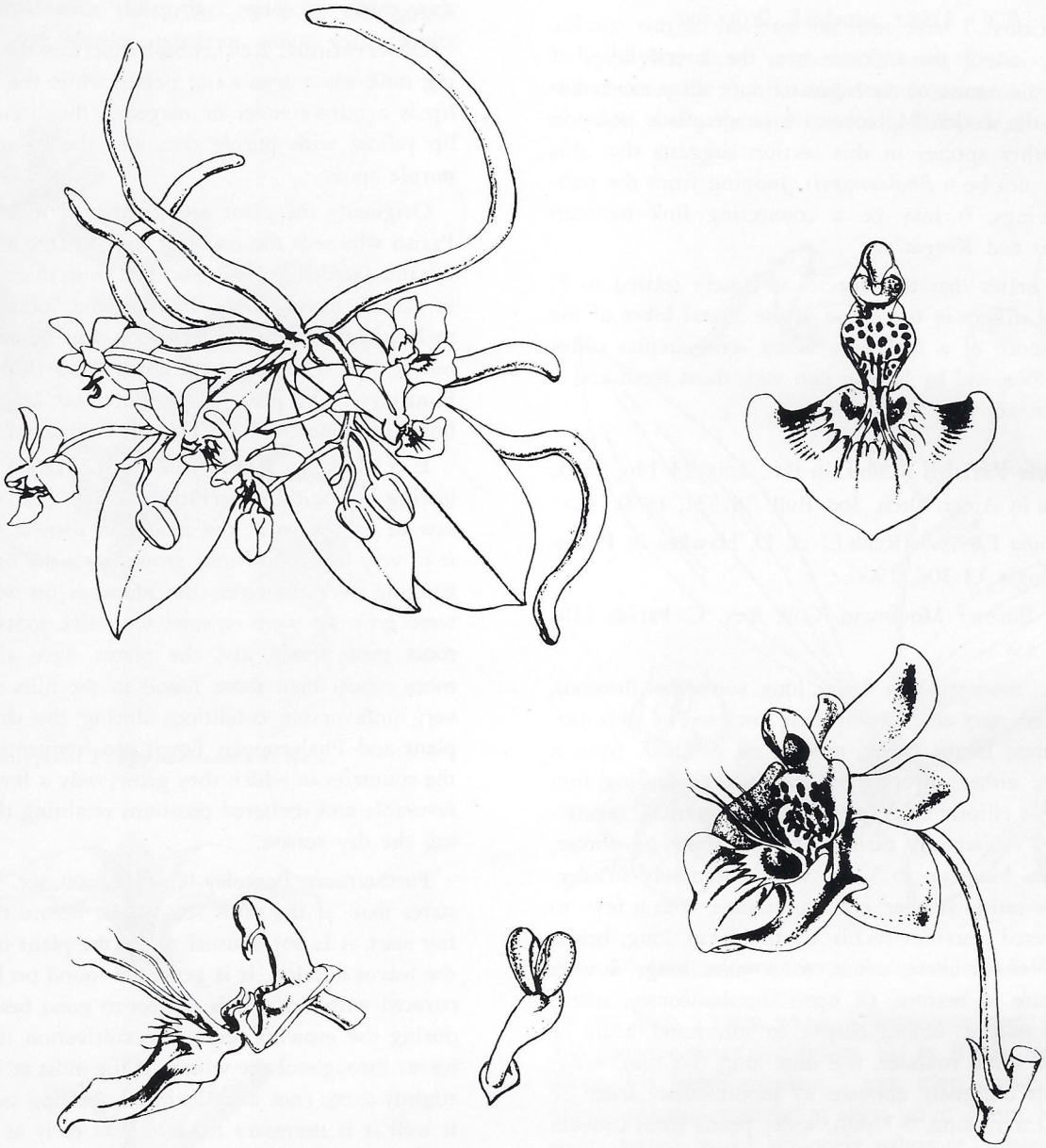
E. S. Berkeley (Orch. Rev. 1:242, 1893) makes the following ecological observations: "The best varieties I ever saw of this were in the mountain district, where I found it in very damp positions growing on the branches of trees hanging over the river; the branches on which the plants were growing were covered with live moss, in which the roots grew freely, and the plants were altogether much more robust than those found in the hills and exposed to very unfavorable conditions during the dry season. This plant and Phalaenopsis Lowii are frequently deciduous in the countries in which they grow; only a few plants in very favorable and sheltered positions retaining their leaves during the dry season."

Furthermore, Berkeley (Gard. Chron. ser. 3, 2:280, 1887) states that "if the rains set in late, before the leaves get a fair start, it is not unusual to see the plant in flower before the leaves develop. It is generally found on boughs of trees covered with moss; it is subject to great heat and moisture during the growing season. In cultivation it will retain its leaves throughout the winter, if the moss at its roots is kept slightly damp (not wet) during the resting season. To flower it well it is necessary to start it as early as possible, so as to encourage leaf growth. No doubt it flowers better when the leaf growth is luxuriant."

I have seen no living flowers of this species and so far as I know there are no plants of *Phalaenopsis Parishii* in cultivation today.

While investigating other Sarcanthine orchids which in the past have been either confused with, or assigned to, *Phalaenopsis,* but now definitely represent other genera, I came upon the illustration of *Aerides decumbens* Griff. from Burma. This species is now generally known under the name of *Kingiella decumbens* (Griff.) Rolfe, or more recently, *Kingidium decumbens* (Griff.) P. F. Hunt.

Aerides decumbens represents a major nomenclatorial problem. First, it had never been described by Griffith. It is merely mentioned in his posthumously published book,



Phalaenopsis Parishii **from Saunder's Refugium Botanicum 2: t. 85, 1870.**

Notulae ad plantas Asiaticas 3:365, 1851, as a name to a heading of explanation of Plate 320 of his Icones Plantarum Asiaticarum 3:1851.

Although the International Code of Botanical Nomenclature, article 44, states, "The name of a species . . . published before January 1, 1908, is validly published if it is accompanied only by an illustration with analysis showing essential characters," *Aerides decumbens* fails to meet this requirement. The illustration represents the general aspects of a plant in flower and an enlarged drawing of a pollinium. In examining the illustration I have been struck by its great resemblance to plants now known under *Phalaenopsis Parishii.* As a matter of fact the very short peduncle and rather loosely branched rachis with flowers much to large were referred by Rolfe to *Phalaenopsis Wightii* Rchb.f., but they are certainly the correct size for *P. Parishii.* On the other hand, *P. Wightii* always shows a rather long, slender peduncle with few and much smaller flowers crowded at the apex.

During the month of September 1970, I had the opportunity to examine the actual material collected by Griffith which is in the Herbarium of the Royal Botanical Garden,

Kew, England. The examination has shown it to be, indeed, the species now known as *Phalaenopsis Parishii.*

The natural course would be in this case to adopt Griffith's name for *P. Parishii.* Such an action, however, would precipitate additional confusion since Griffith's name has already been used to create *Phalaenopsis decumbens* (Griff.) Holtt., now a synonym of *Kingidium decumbens* (Griff.) P. F. Hunt. The onus of the misidentification of this basionym lies with Rolfe. Apparently subsequent workers up to the present took Rolfe's opinion as indisputable.

P. F. Hunt (Amer. Orch. Soc. Bull. 40:1093, 1971) has argued that the illustration includes in detail the shape of the pollinia, and that is sufficient for valid publication. It must be remembered, however, that the shape of the pollinia is a diagnostic character for the genus *Phalaenopsis* as a whole and not for the species.

Article 69 of the International Code of Botanical Nomenclature which says, "A name must be rejected if it is used in different senses and so has become a long-persistent source of error," is applicable to the case of *Aerides decumbens.* Indeed, it has served as a basionym for *Kingiella decumbens* (Griff.) Rolfe, *Biermannia decumbens* (Griff.) Tang & Wang, *Phalaenopsis decumbens* (Griff.) Holtt., and *Kingidium decumbens* (Griff.) P. F. Hunt. Now to apply all of these to *Phalaenopsis Parishii* Rchb.f. would invite nomenclatorial disaster. Therefore, *Aerides decumbens* as a name-bringing synonym is rejected on two accounts: 1, not having been validly published and 2, having been the source of error.

Primary Crosses

Phalaenopsis Parishii Rchb.f.

× *P. equestris* = *P.* × *Partris.* 1965 (Thornton)

× *P. fimbriata* = *P.* × Green Imp. 1973 (F. L. Thornton)

× *P. Lueddemanniana* = *P.* × Minuet. 1976 (Wallbrunn)

× *P. Mannii* = *P.* × Parma. 1971 (Norrsell)

× *P. Schillerana* = *P.* × Pink Heart. 1979 (Wallbrunn)

× *Renanthera monachica* = × *Renanthopsis* Tiny Tim. 1965 (McCoy)

× *Vanda suavis* = × *Vandaenopsis* Mem. Hugo Peiris. 1959 (Ceylon Botanic Gardens: J. W. L. Peiris)

It is not always possible to determine what the hybridizer had in hand because varietal names have never appeared in the parentage. This should be kept in mind, since the former *P. Parishii* var. *Lobbii* is treated in this work as a distinct species, *Phalaenopsis Lobbii.*

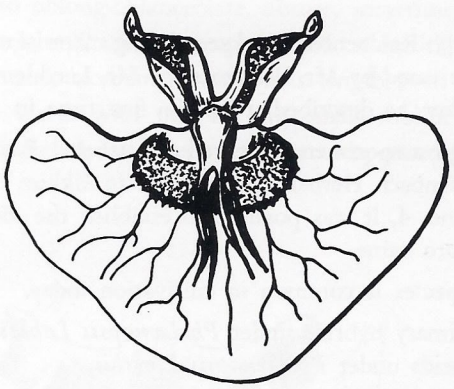
Phalaenopsis Lobbii (Rchb.f.) Sweet, *stat. nov.*

Basionym: *Phalaenopsis Parishii* var. *Lobbii* Rchb.f. in Saunders, Refug. Bot. 2: sub t. 85, 1870.

Type: Eastern Himalaya, without precise locality. Cult. Messrs. Veitch. Coll. Lobb s.n.! (W).

Syn.: *Phalaenopsis Listeri* Berkeley in Gard. Chron. ser. 3, 1:280, 1887. *Nomen.*

Epiphytic plants with copious roots; stem rather short, completely enclosed by imbricating leaf bases; leaves broadly elliptic, obliquely notched at apex, up to 13 cm. long and 5 cm. wide; inflorescence rather slender, shorter than the subtending leaves, suberect, loosely up to 6-flowered; bracts very small, elliptic, obtuse; flowers rather fleshy in texture, several open simultaneously; sepals and petals creamy white, midlobe of lip with a pair of rather wide, vertical, chestnut-brown or rusty brown bands; dorsal sepal oblong-elliptic, obtuse, up to 10 mm. long and 5 mm. wide; lateral sepals



Lip of *P. Lobbii.*

obliquely ovate to suborbicular, obtuse, up to 8 mm. long and 7 mm. wide; petals from a cuneate base obovate-subspathulate, obtuse to rounded, up to 8 mm. long and 4 mm. wide; lip with a short claw, adnate to column-foot, 3-lobed; lateral lobes arrect, triangular with a fleshy keel, acute, up to 3 mm. long and 1 mm. wide; midlobe movable, from a truncate base transversely triangular with rounded apices, rather fleshy, concave, at base provided with a semicircular, fleshy, partially free plate which is at most irregularly denticulate along margin, at junction of midlobe and lateral lobes there is a fleshy, flat projection, deeply divided into four filiform segments; midlobe up to 6 mm. long and 10 mm. wide; column short, somewhat arcuate, up to 5 mm. long; pedicellate ovary up to 15 mm. long.

Distribution: Sikkim, Bhutan, Assam, Burma.

SIKKIM: Himalaya. Coll. Pantling 74! (AMES,BM,BR,K, L,P,W); Coll. Lobb s.n.! (W); Coll. Foerstermann 4! (W). Darjeeling. Coll. Mann s.n.! (W). ASSAM: Cachar. Coll. Keenan s.n.! (K); Coll. Mann s.n.! (K,W). Khasia Hills. Coll. Mann s.n.! (K); Coll. Brandis s.n.! (W). BURMA: Nampakom. Coll. Carr 5777! (K). Also living cultivated flowers have been studied.

Illustrations: Ann. Roy. Bot. Gard. Calcutta 6: t. 263, 1898; Grubb, Select. Orch. Pl. part 2:54, t. 1962.

Observations: This species differs from *Phalaenopsis Parishii,* in addition to the distribution pattern, in the

texture and color of the flowers. Moreover, the semicircular, free and rather tumid plate with irregularly denticulate margin on the midlobe of lip is quite distinct from the thin and long-fringed plate found in *P. Parishii.*

Reichenbach (Saunders, Refug. Bot. 2: sub t. 85, 1870) gives the following short account: "We always feel very scrupulous in stating who has discovered a species. Three months ago we should have believed that Rev. Mr. Parish, whose botanical merits are beyond all praise, was the discoverer; and yet he is not, the same species having been gathered by T. Lobb so early as 1845, in the Eastern Himalaya. . . . We are indebted for a good specimen to Messrs. Veitch, who had most accidentally failed to give it to Dr. Lindley."

Although Reichenbach had seen living material at various times cultivated by Mr. Pescatore for Mr. Lueddemann and by Mr. Day, he described it for the first time in 1870.

Through a specimen preserved and labeled *P. Listeri* in the Reichenbach Herbarium, collected in Sikkim by Foerstermann no. 4, it was possible to establish the identity of this obscure name.

This species is common in cultivation today.

For primary hybrids under *Phalaenopsis Lobbii* see primary hybrids under *Phalaenopsis Parishii.*

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Section **POLYCHILOS** (Breda) Rchb.f. in Bot. Zeit. 22: 298, 1864; Sweet in Amer. Orch. Soc. Bull. 37:873, 1968; *ibid.* 38:511, 1969.

Basionym: *Polychilos* Breda in Kuhl and van Hasselt, Gen. et Spec. Orch. 1, 1827.

Syn.: *Polystylus* Hassk. in Natuurk. Tijdschr. Nederl. Indië 10:3, 1856.

Flowers fleshy; sepals and petals similar; lip lobate with gibbous cavity in center; apical lobe of lip more or less anchor-shaped and the base of the lip continuous with the column-foot.

Type: *Polychilos cornu-cervi* Breda = *Phalaenopsis cornu-cervi* (Breda) Blume.

Note: Reichenbach first used the name *Polychilos* as a category below the genus in Bot. Zeit 22:298, 1864, but without assigning a definite rank to it. According to the International Code of Botanical Nomenclature, Article 35, for names without a clear indication of the rank of the taxon, published before January 1, 1953, the choice made by the first author who assigned a definite rank to them must be followed. Consequently, *Polychilos* becomes a sectional name because O. Kuntze in Post et Kuntze, Lex. Gen. Phan. 430, 1903, assigned that rank to it. Because the choice of that rank is retroactive, the name *Polychilos* as used by Reichenbach becomes a sectional status.

KEY TO THE SPECIES

1. Rachis of inflorescence complanate, winged.....2
1a. Rachis of inflorescence terete, without wings.....3
2. Petals at right angle to dorsal sepal; midlobe of lip with a distinct isthmus.....**P. pantherina**
2a. Petals at oblique angle with dorsal sepal; midlobe of lip without an isthmus.....**P. cornu-cervi**
3. Lip with a circular, shallow gibbosity at base of midlobe; midlobe anchor-shaped 4
3a. Lip with a horseshoe-shape excavation at base of midlobe; midlobe trowel-shaped....**P. × Valentinii**
4. Apical lobe of lip glabrous with entire margin; plate-like appendage with lacerate margins and composed of transverse dentate plates....**P. lamelligera**
4a. Apical lobe of lip papillose with erose-denticulate margin; plate-like appendage with entire margin and bicirrhous in front .....**P. Mannii**

ENUMERATION OF SPECIES

Phalaenopsis pantherina Rchb.f. in Bot. Zeit. 22:298, 1864; Sweet in Amer. Orch. Soc. Bull. 38:511, 1969.

Type: Introduced from Borneo and cultivated by Low s.n.! (W).

Syn.: *Phalaenopsis luteola* Burb., The Garden of the Sun, 258, 1880. *Nomen.*

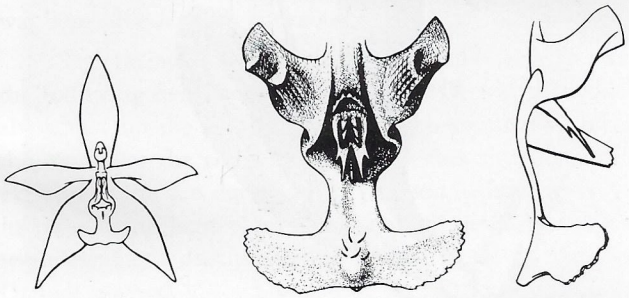
Epiphytic; roots, stem and leaves presently unknown; inflorescence, a part of which is preserved, to 10 cm. long, arcuate, terete, with a short laterally compressed, somewhat flexuous rachis; raceme distichous, few-flowered; bracts ovate-cucullate, hamate, up to 5 mm. long; flowers firm with spreading floral segments, waxy; dorsal sepal narrowly lanceolate or lanceolate-elliptic, acute, dorsally distinctly carinate toward apex, margins revolute, 25 mm. long, 9 mm. wide; lateral sepals obliquely ovate-lanceolate, acute, dorsally distinctly carinate toward apex, 28 mm. long, 10 mm. wide; petals at right angle to dorsal sepal, lanceolate-elliptic, acute, dorsally distinctly carinate at apex, basally margins revolute, thus appearing long-stalked, when expanded 19 mm. long, 7 mm. wide; lip fleshy, 3-lobed, lateral lobes subquadrate with truncate apex below which there is a fleshy callus; lateral lobes confluent with base of midlobe forming a flat, semicircular gibbosity, from this the midlobe extends into a prominent isthmus and abruptly expands into a transversely reniform anchor-shaped apical lobe with erose-dentate margins; disc at apex provided with an ovoid callus, the base of which is sparsely covered with hairs; the center of gibbosity is provided with an erect oblong-linear, laterally compressed truncate appendage and projecting over it originating from distal end of gibbosity is another bidentate plate-like fleshy structure, each side of which is provided with a small tooth, at its base there is an additional retrorse, dentate-edged callus; length of whole lip 15 mm., width across lateral lobes 10 mm., width across apex of midlobe

12 mm.; column cylindric, arcuate, somewhat dilated towards apex, basally and laterally provided with a small protuberance on each side, up to 8 mm. long; pedicellate ovary to 15 mm. long.

Distribution: Borneo and Sarawak.

BORNEO. Cult. Low s.n.! (W); Coll. Baram 32! (W); Kalimantan. Coll. Wie s.n.! (AMES). SARAWAK. Labuan. Cult. Veitch. Coll. Burbidge s.n.! (W).

Observations: Reichenbach describes the flowers as yellow covered with red spots, hence the name. In the Reichenbach Herbarium there is a specimen collected at Labuan, British North Borneo, by Burbidge which was sent to Reichenbach by Veitch in November, 1879. Undoubtedly this specimen represents what Burbidge describes in The Gardens of The Sun as follows: ". . . and on some wet mossy rocks beside a rushing torrent, a glossy-leaved Phalaenopsis (P. luteola) displayed its golden blossoms, each sepal and petal mottled with cinnabar."



Flower and lip of *P. pantherina*. Drawn from type.

In 1905, Rolfe (Orch. Rev. 13:230, 1905) suggested that *P. luteola* should be compared with *P. pantherina,* since both were from Borneo, but he did not see any material of this species.

Phalaenopsis pantherina can be distinguished readily from *P. Mannii* by the long isthmus to the midlobe of the lip and by the right-angled insertion of the petals. It differs from *P. cornu-cervi* in the shape of the lip, although *P. cornu-cervi* also possesses a laterally compressed rachis.

PRIMARY CROSSES

Phalaenopsis pantherina Rchb.f.

× *P. amboinensis* = *P.* × Doris Blomquist. 1975 (Kolopaking)

Phalaenopsis cornu-cervi (Breda) Bl. & Rchb.f. in Hamb. Gartenz. 16:116, 1860; Sweet in Amer. Orch. Soc. Bull. 38:512, 1969.

Basionym: *Polychilos cornu-cervi* Breda in Kuhl & van Hasselt, Gen. et Spec. Orchid., t. 1, 1827.

Type: Java. Bantam Province. Coll. van Hasselt s.n.! (L).

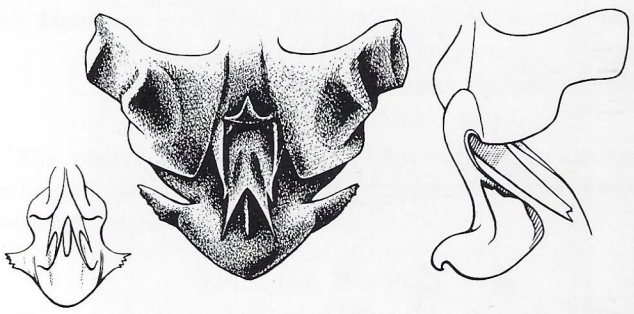
Syn.: *Polystylus cornu-cervi* Hassk. in Natuurk. Tijdschr. Nederl. Indië 10:3, 1856.

Type: Java. Coll. Lobb s.n.! (K-L).

Phalaenopsis Devriesiana Rchb.f. in Hamb. Gartenz. 16:116, 1860.

Type: Java. Coll. DeVries s.n.! (W).

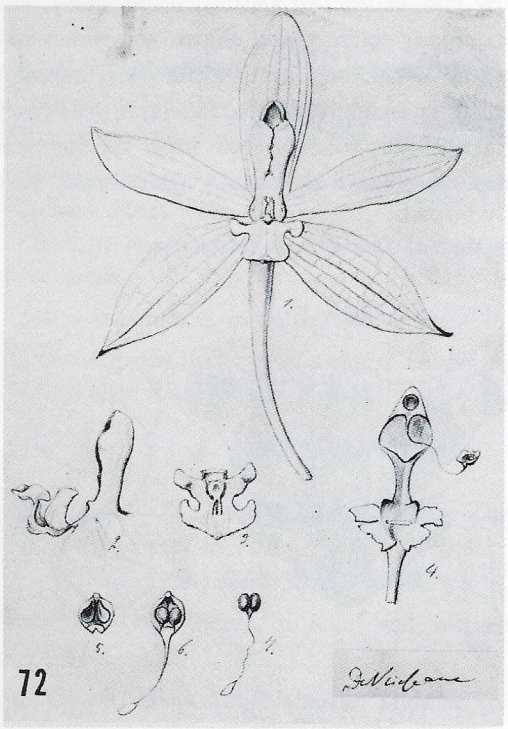
Epiphytic; plants often quite robust; roots profusely produced from rhizome-like stem, fleshy, flexuous, often branched, glabrous; stem rather short, robust, completely enclosed by imbricating leaf sheaths; leaves fleshy, oblong-ligulate to oblong-oblanceolate, obtuse, sometimes bilobed at apex, up to 22 cm. long, up to 4 cm. wide; inflorescence one to several, exceedingly variable in length, 9-42 cm. long; peduncle terete with one or two small cauline sheaths; rachis simple or branched, laterally compressed, flexuous,



Lips of *P. cornu-cervi*.

complanate-alate, commonly several-flowered; bracts alternate, distichous, ovate-cucullate, hamate, dorsally keeled, up to 5 cm. long; flowers fleshy, waxy with spreading floral segments, several opening simultaneously; dorsal sepal obovate-elliptic to oblanceolate-elliptic, dorsally prominently carinate toward apex, margins slightly recurved, 18-23 mm. long, 5-8 mm. wide; lateral sepals elliptic to elliptic-lanceolate, somewhat oblique, acute or subacuminate, dorsally distinctly carinate toward apex, 19-23 mm. long, 7-9 mm. wide; petals lanceolate or elliptic-lanceolate, acute or obtuse, dorsally somewhat thickened at apex, 7-18 mm. long; 5-6 mm. wide; lip fleshy, 3-lobed, lateral lobes porrect, subquadrate with truncate apex below which there is a fleshy, callus; lateral lobes confluent with base of midlobe forming a flat semicircular gibbosity; midlobe in front of gibbosity suddenly constricted then expanding into an anchor-shaped, in front triangular, apical lobe, margins of anchor-shaped portion are erose-dentate, the acute or obtuse apex is provided beneath with a fleshy hook-like protuberance; center of gibbosity is provided with an erect oblong-linear, lateral-

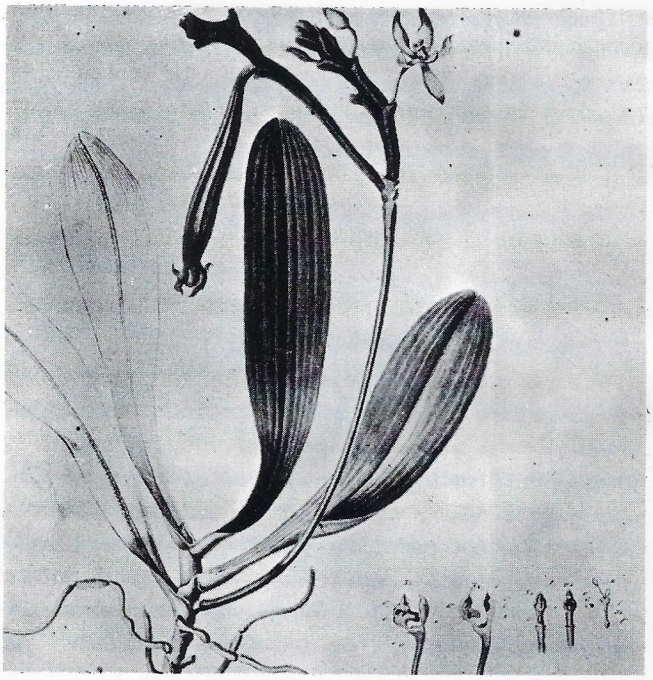
ly compressed, apically dentate appendage, projecting over it and originating from distal end of gibbosity is another plate-like convex bicirrhous structure, margin of which on each side is provided with a more or less well-developed acuminate tooth, at base of plate there is an additional retrorse lanceolate-acuminate projection; length of whole lip 8 mm., width across lateral lobes 10 mm., width across apex of midlobe 8 mm.; column fleshy, somewhat arcuate, cylindric, somewhat dilated towards apex, basally on each side provided with a small protuberance, up to 8 mm. long; pedicellate ovary up to 3 cm. long. Chromosome no. $2n = 38$.



Copy of de Vries' original drawing of *P. Devriesiana*, a synonym of *P. cornu-cervi*.

Distribution: Sarawak, Borneo, Java, Sumatra, Thailand, Malaya: Kedah, Perak, Pahang, Selangor, Negri Sembilan. Nicobar Islands and Burma.

BURMA. Moulmein. Coll. Lobb. 166! (K,W), 238! (W); Coll. Foerstermann s.n.! (K); Coll. Parish s.n.! (K,W). Tavoy, Paya Rocks. Coll. Shaik Mokim s.n.! (AMES). THAILAND. Hauy Mae Tam, Lampang. Coll. Kerr 135! (K). Doi Yao, Muang Pai. Coll. Kerr s.n.! (K). Wangka Surin. Coll. Kerr 291! (K). Aranya Prathet. Coll. Kerr 3142 (K), 3142A! (K). Klung Chamburi. Coll. Kerr 783! (K). Neecky, Wangka. Coll. Kostermanns 80! (K). Nawng Kai Ploi, Sriracha. Coll. Kerr 287! (K). Khao Saming, Trat. Coll. Kerr 423! (K). Pan Paung River, near Ka Tha Lai. Coll. Kostermanns s.n.! (L). Ban Ti River. Coll. Kostermanns s.n.! (L). Thung Nui, Satul. Coll. Kerr 548! (K). Tripagodas, near Burma border. Coll. Kostermanns 385! (L). Wat Spa Uhm, Bandon River. Coll. Seidenfaden 2207! (C). Southeast between Chanthaburi and Trat. Coll. Larsen, *et al.* 32427! (C,AAU). MALAYA. Kedah State, Sungai Terap. Coll. Henderson 35430! (K). Pahang State. Coll. Evans s.n.! (K). Perak State. Coll. Scortechini 1286! (K); Coll. Henderson 34453! (K); State unknown. Cult. Low s.n.! (W). NICOBAR ISLANDS. Kamorta. Coll. Kurz s.n. SUMATRA. Deli. Cult. Hort. Bog. s.n. (BO). Agam, Paloepoe. Coll. Jacobson. Cult. Hort. Bot. sub no. 1818 (BO). Lampoeng, Poegoeng. Coll. Gusdorf. Cult. Hort. Bog. sub no. 16 (BO). Manggala. Coll. Gusdorf. Cult. Hort. Bog. sub no. 26 (BO). JAVA. Bantam. Coll. van Hasselt s.n.! (BO,L,W). Panembang. Coll. van Hasselt 2235! (BO,L,P); Coll. Rimann s.n.! (W); Coll. Shaik Mokim 640! (BM,BR); Coll. DeVries



***Phalaenopsis cornu-cervi*. A copy of the original plate of *Polychilos cornu-cervi* from Breda, Genera et Species Orchidearum, t. 1, 1827.**

s.n.! (W); Coll. Lobb s.n.! (K). BORNEO. West Koetai, Benoewatoewa. Coll. Endert 1645! (L). Bonga Jambu. Coll. unknown, 3! (W), 13! (W). Pontianak. Coll. Foerstermann s.n.! (W). Bangarmassing. Coll. Motley 1011! (K). SARAWAK. Coll. Curtis s.n.! (W); Coll. Purseglove P 5490! (K). Batang River. Tinjar. Coll. Fuchs 21219 (Shell Research Herb.)

Illustrations: J. J. Smith, Orch. Java. Fig.-Atlas pt 5, fig. 415, 1912; Seidenfaden & Smitinand, Orch. Thailand 4: fig. 403, 1963; Orch. Digest 36:168, 1972, Katoh & Futakuchi, Orchids in Colour pl. 114, fig. 4, 1974.

Observations: *Phalaenopsis cornu-cervi* was first described by Breda (Gen. et Spec. Orch., t. 1, 1827) under the name of *Polychilos cornu-cervi*. However, Reichenbach and Blume later recognized jointly that it is referable to the earlier described genus *Phalaenopsis*. Since Breda's work is not generally accessible, a photograph of the original plate is reproduced here. Although attempts were made to

introduce it into cultivation, it was reported in Curtis' Botanical Magazine in 1866 that plants never reached England in a living condition before 1864, when a few of them through Rev. C. S. Parish were successfully sent from Moulmein to Messrs. Low & Co.

One of the outstanding characteristics of this species is the inflorescence with its terete, basally tapering peduncle and its laterally compressed, flexuous, complanate-alate rachis. The alternating, distichous bracts are dorsally keeled. These characteristics can be seen in Breda's original plate.

The lips are variable and there are usually no hairs or papillae on the midlobe of the lip.

The yellow to yellowish green flowers are quite variable. The sepals are marked to varying degrees with reddish brown or cinnamon-colored bars, spots and blotches. Sometimes the flowers have very little yellow. The lateral sepals have more pronounced or conspicuous markings on the outer halves. The lip is white or whitish with parallel reddish brown or cinnamon-colored stripes on the lateral lobes and on the base of the column.

Phalaenopsis Devriesiana, once thought to be different, is based on a drawing by DeVries, see figure, and is in no way separable from *P. cornu-cervi.*

E. S. Berkeley (Gard. Chron. ser. 3, 1:449, 1887) offers the following field notes: "This curious Orchid is found in abundance on the stunted bushes in the swampy islands at the mouth of the river Irrawaddy. In this situation, being exposed to the sun during the dry season, it loses its leaves, its roots being kept plump by the night dews, and it consequently has a distinct resting season. Plants of the same Orchid growing in the shade have no resting season, being a mass of blossom throughout the dry season, and losing none of their leaves.

"P. Cornu-cervi is found from Akyub north, throughout the whole of Burmah, down to Tavoy, Mergui, and Perak, south, in the Mergui Archipelago, and also in Java; occasionally in the hills, abounding in the plains, and flourishing luxuriantly in the dense shade of the forest, where it is protected from dry winds.

"In 1870 the Bamboos in the jungle north of the road running from Pegu to Shoagheen flowered, and, as is the habit of many varieties of Bamboos after flowering, the Bamboo clumps died and rotted down, thus rendering it possible to penetrate into a forest which had been closed for years. The few scattered trees growing in the Bamboo jungle were Mango trees. The trunks of these very shady trees were found covered with huge masses of Phalaenopsis Cornu-cervi, growing in the dense shade, where they had been unmolested for many years. The plants were perfect masses of leaf-growth of extraordinary vigour, and bore such quantities of flowers as would delight an English orchidist. This was the solitary Orchid found in this shady forest, and there is probably no other Orchid that would exist with so little light and sun.

"Most Orchids are found on the outskirts of the forest, where there is plenty of light, or on the tops of the trees. The traveller may go for miles in the shade of the forest and never see an Orchid. It appears from these observations that to grow this plant to perfection, a very shady situation is necessary. Unfortunately the poor deciduous variety which bears comparatively very poor flowers is the one that survives the journey to England, the large non-deciduous one found in the jungle being too soft to travel.

"The largest and finest plants (Orch. Rev. 1:243, 1893) I ever saw were growing in great masses on the trunks of the wild mango trees, in dense shade, in which position they flower very freely, and it is a pity that we never see such fine plants in England, as under such conditions they produce, not only numerous flower-spikes, but flowers good in form and shape, such as we have never seen in our English hothouses."

The following variety has been noted:

Phalaenopsis cornu-cervi var. **picta** (Hassk.) Sweet in Amer. Orch. Soc. Bull. 38:514, 1969.

Basionym: *Polystylus cornu-cervi* var. *picta* Hassk. in Natuurk. Tijdschr. Nederl. Indië 10:4, 1856.

Neotype: Bot. Mag. 92: t. 5570, 1866. Neither precise locality has been noted nor the type specimen preserved. (Sweet in Amer. Orch. Soc. Bull. 38:514, 1969.)

The variety differs from the common form in having, in lieu of colored spots and dots on sepals and petals, well-developed transverse colored bars.

Excluded Variety

P. cornu-cervi var. *Singapore* Hort. in Bull. Jard. Bot. Buitenz. ser. 3, 1:120, 1919. *Nomen nudum.*

Primary Crosses

Phalaenopsis cornu-cervi (Breda) Bl. & Rchb.f.

× *P. amabilis* = *P.* × Little Star. 1962 (Ceylon Bot. Gard.)
× *P. amboinensis* = *P.* × Corona. 1973 (Shaffer)
× *P. cochlearis* = *P.* × Golden Bantam. 1970 (Wallbrunn)
× *P. equestris* = *P.* × *Cornustris.* 1967 (Thornton)
× *P. fasciata* = *P.* × Little Girl. 1974 (Webb: Thornton)
× *P. fimbriata* = *P.* × *Corbriata.* 1968 (Thornton)
× *P. Lindenii* = *P.* × *Lincervi.* 1967 (Thornton)
× *P. Lueddemanniana* = *P.* × El Tigre. 1964 (Miller)
× *P. Mannii* = *P.* × *Mancervi.* 1967 (Thornton)
× *P. Mariae* = *P.* × Little Leopard. 1973 (Wallbrunn)
× *P. Sanderana* = *P.* × Lokelani. 1949 (Kirsch)
× *P. Stuartiana* = *P.* × Stewed Corn. 1978 (Thornton)
× *P. sumatrana* = *P.* × Tiger Cub. 1972 (Wallbrunn)
× *P. violacea* = *P.* × *Valentinii* Rchb.f. 1883 (Nat. hybr.)

× *P. viridis* = *P.* × Ibu Kasman. 1978 (Kolopaking)

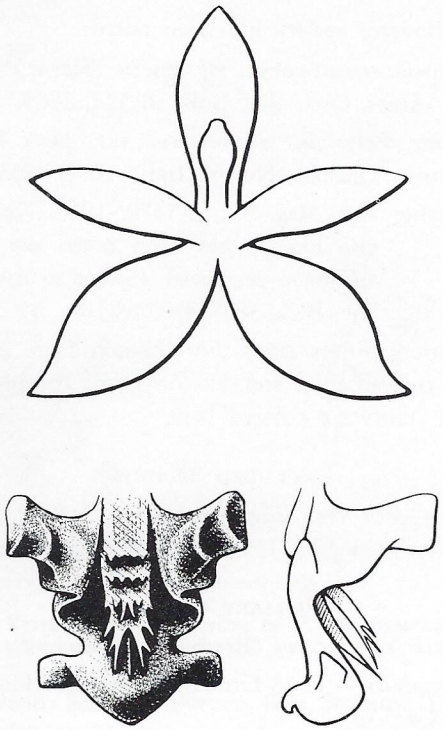
× *Doritis pulcherrima* = × *Doritaenopsis* Summer Red. 1969 (Nagata)

× *Kingiella philippinensis* = × *Phaliella* Speck O' Gold. 1972 (Thornton)

Phalaenopsis lamelligera Sweet in Amer. Orch. Soc. Bull. 38:516, 1969.

Type: Borneo. Introduced in 1891 and cultivated by Bull 83! (K).

Habit unknown; flowers with spreading segments, fleshy, to 3 cm. across; dorsal sepal oblanceolate, acute, dorsally carinate toward apex, at base with somewhat revolute margins, 18 mm. long, 7 mm. wide; lateral sepals obliquely



Flower and lip of *P. lamelligera*. Drawn from type.

lanceolate-obovate, acute, dorsally toward apex prominently carinate, basally with revolute margins, 20 mm. long, 9 mm. wide; petals oblanceolate, acute, basally with revolute margins, 15 mm. long, 6 mm. wide; lip 3-lobed, fleshy, lateral lobes subquadrate, with fleshy callus below truncate apex, then confluent with the circular gibbous base of midlobe; midlobe constricted in front of gibbosity, then suddenly expanded on both sides into a quadrate apical lobe, the front of which is folded under forming a triangular apex; in center of gibbosity there is an obliquely ascending laterally compressed linear-lanceolate sharply pointed appendage, above which originating from base of gibbosity and projecting over it is another bidentate plate-like fleshy structure both sides of which are lacerate-dentate, the plate itself is composed of a set of 3 superimposed plates grown together but with free transverse denticulate edges, length of whole lip 10 mm., width across lateral lobes 11 mm., width across apex of midlobe 8 mm.; column cylindric, somewhat arcuate, slightly dilated toward apex, basally provided with a small protuberance on each side, 8 mm. long; pedicellate ovary 15 mm. long.

Distribution: Borneo. Only the type specimen has been seen.

Observations: The above description is based on a single flower preserved in the herbarium of the Royal Botanic Garden, Kew, England. The structure of the lip is so unique in this section that a description is justified in order to call attention to the existence of this remarkable form for future collectors in Borneo. It is hoped that the current activity of collecting in Borneo will soon provide additional material to complete the description.

Rolfe noted on the type sheet of this species that it may be referable to either *P. maculata* or *P. pantherina*. His choice is understandable since he had no access to either of the type specimens. He also noted on the sheet a reference to *P. luteola* which was never described properly.

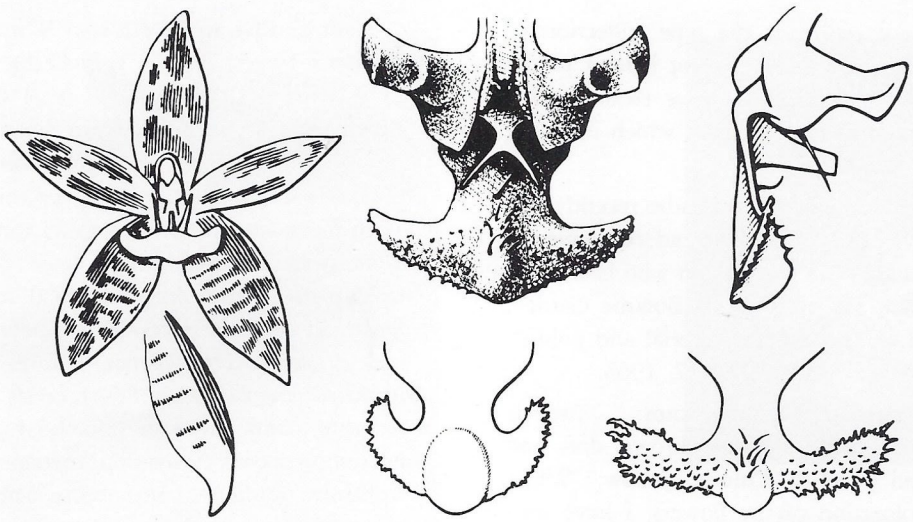
Phalaenopsis Mannii Rchb.f. in Gard. Chron. 902, 1871; Sweet in Amer. Orch. Soc. Bull. 38:517, 1969.

Type: India: Sikkim, Upper Assam. Coll. Mann 10! (W).

Syn.: *Phalaenopsis Boxallii* Rchb.f. in Gard. Chron. n.s. 19:274, 1883.

Type: Burma, without precise locality. Coll. Boxall s.n.! (W).

Epiphytic, pendent; roots copious, rather long, flexuous, glabrous; stem short, completely enclosed by imbricating leaf sheaths; leaves 4-5, fleshy, oblong-oblanceolate to oblong-ligulate, acute, occasionally obtuse, up to 37 cm. long, up to 7 cm. wide, commonly smaller; inflorescence slender, 1-2, pendent, simple, rarely branched, as long as leaves, very rarely longer; rachis loosely many-flowered; flowers opening in succession, long lasting, waxy, fleshy, with spreading floral segments; bracts ovate-lanceolate, convex, up to 1 cm. long; dorsal sepal obovate-oblanceolate, acute, margins revolute, dorsally carinate toward apex, 20-24 mm. long, 7-8 mm. wide; lateral sepals obliquely ovate-elliptic with subfalcate tip, acute, dorsally toward apex prominently carinate, margins revolute, 22-25 mm. long, 9-11 wide; petals lanceolate-subfalcate, acute, margins revolute especially toward base, 17-20 mm. long, 5-6 mm. wide; lip very fleshy, 3-lobed with short claw; lateral lobes subquadrate with an obliquely truncate apex, below which there is a fleshy callus in middle, base confluent with midlobe in forming a semicircular gibbosity, from this midlobe extends into a very variable apical lobe, through a more or less well-developed isthmus; apical lobe of midlobe transversely variously anchor-shape with an erose-dentate margin, occasionally



Flower and variations in shape of the lip of *P. Mannii.* Drawn from type and other specimens identified by Reichenbach.

quite lacerate, upper surface of midlobe densely covered with small papillae, at apex provided with an ovoid callus which may or may not bear a few hairs; center of gibbosity is provided with an erect oblong-linear laterally compressed truncate appendage, projecting over it and originating from distal end of gibbosity is another plate-like, fleshy, pandurate structure, bicirrhous in front and provided with a smooth entire margin, at its base a small cavity, length of whole lip 9-11 mm., width across lateral lobes 10-11 mm., width across apex of midlobe 8-10 mm.; column cylindric, fleshy, slightly arcuate, somewhat dilated toward apex, basally provided on each side with a prominent protuberance, 8 mm. long; pedicellate ovary up to 3 cm. long. Chromosome no. 2n = 38.

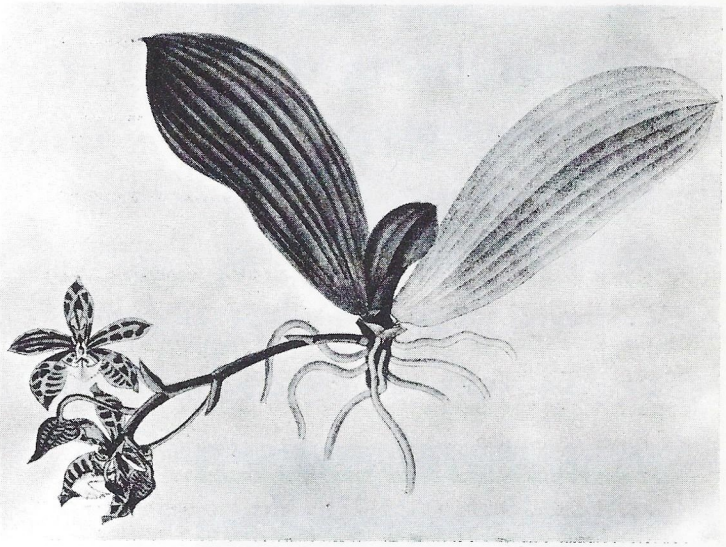
Distribution: India, Sikkim, Assam; Viet Nam.

INDIA: Sikkim. Coll. Mann 10! (W); Coll. Pantling 263! (AMES,BM,BR,K,L,P,W). Assam. Col. Prain 14! (K), 72! (BM,K); Khasia Hills. Coll. Foerstermann 5! (W). BURMA: Coll. Boxall s.n.! (W). VIET NAM (Annam): Coll. Poilane 11222! (P). Also living cultivated flowers have been studied.

Illustrations: Ann. Roy. Bot. Gard. Calcutta 5: t. 56, 1895; Amer. Orch. Soc. Bull. 35:752, 1966; Orch. Digest 36:168, 1972.

Observations: *Phalaenopsis Mannii* Rchb.f. was first discovered in May 1868, in Sikkim by Gustav Mann who sent dried specimens and an accurate drawing to Reichenbach who first described it in 1871. Later, Reichenbach described it again under *Phalaenopsis Boxallii.* However, after having studied the type specimen, I find it not separable from *P. Mannii.*

The name, *Phalaenopsis Boxallii,* has been the source of much confusion in horticultural circles. This species was collected in Burma by Boxall for Messrs. Low & Co., although Reichenbach in The Gardeners' Chronicle in 1883 erroneously says it was collected in the Philippines. There is also a drawing of the original plant in the Day Collection at Kew made on February 27, 1883 at Messrs. Low & Co. from which Reichenbach made the description, that fully agrees with Reichenbach's own sketches. Subsequent authors have accepted the Philippines as being the source for plants under this name.



***Phalaenopsis Mannii* Rchb.f. A copy from Ann. Roy. Bot. Gard., Calcutta 5: plate 56, 1895.**

It must be emphasized here that *P. Boxallii* Rchb.f. has no relation whatsoever to *P. Lueddemanniana,* although growers mention it as a variety under this latter species. No such valid combination has ever been published.

Quisumbing in the Philippine Journal of Science 77:9, 1957, unfortunately says that the only difference between *P. Boxallii* and the other forms of *P. Lueddemanniana* is in the color of the flowers. Thus, in the literature and in horticulture the yellow forms of *P. Lueddemanniana* have been erroneously named *P. Lueddemanniana* var. *Boxallii.* The source of this mistake can be traced to an herbarium sheet in the Reichenbach collections which contains three dried

flowers, but they do not represent the type collection of *P. Boxallii*. In fact, these specimens do not belong to the species either in the *Polychilos* or *Zebrinae* sections. One of the flowers is referable to *P. Aphrodite* which is in the section *Phalaenopsis*.

The type specimen of *P. Boxallii* until quite recently was misplaced in the Reichenbach collection and consequently was not available for study. The first person who had access to it was Professor Erich Holttum, Royal Botanic Garden, Kew, England. He did study the type material and publish his findings in The Orchid Review 71:227, 1963.

Reichenbach gives the following color notes: ". . . sepals and petals yellow, with many cinnamon-brown dots and blotches. Lip white and purplish. Column yellow." While this is the common coloration of the flowers, I have seen flowers with sepals and petals of a uniform yellow to flowers with very faint markings to a few dots, and even flowers with very little yellow. The lips vary in outline, but usually have hairs and papillae on the surface of the midlobe.

The inflorescence of *P. Mannii* differs from those found in *P. cornu-cervi* in having both the peduncle and the rachis round with uniform thickness throughout. This is shown in the plate by Hooker (Ann. Roy. Bot. Gard. Calcutta 5: t. 56, 1895) which is reproduced here. The convex bracts are not keeled dorsally.

Primary Crosses

Phalaenopsis Mannii Rchb.f.

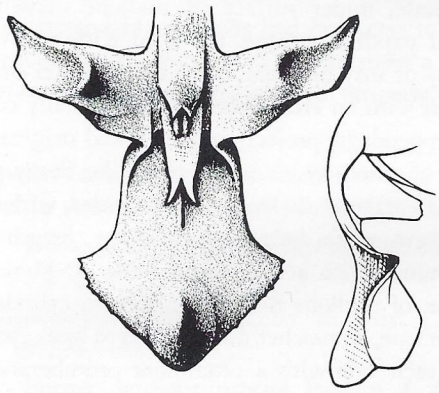
× *P. amabilis* = *P.* × Thor-Flame. 1963 (Thornton)
× *P. amboinensis* = *P.* × Mambo. 1965 (Thornton)
× *P. cornu-cervi* = *P.* × *Mancervi.* 1967 (Thornton)
× *P. equestris* = *P.* × Linda Cheok. 1964 (Kim)
× *P. fimbriata* = *P.* × *Manbriata.* 1968 (Thornton)
× *P. fuscata* = *P.* × *Mannicata.* 1966 (Kuhn)
× *P. gigantea* = *P.* × Rosie Clouse. 1971 (Fort Caroline Orchids: Wallbrunn)
× *P. Lueddemanniana* = *P.* × Hymen. 1900 (Veitch)
× *P. Micholitzii* = *P.* × Margie Lane. 1970 (Thornton)
× *P. Parishii* = *P.* × Parma. 1971 (Norrsell)
× *P. Sanderana* = *P.* × Sandman. 1967 (Thornton)
× *P. Schillerana* = *P.* × Schillman Guillaum. 1930
Syn.: *P.* × Bronze Maiden. 1964 (McCoy)
× *P. Stuartiana* = *P.* × *Stuartiano-mannii.* 1898 (Veitch)
Syn.: *P.* × *langleyensis* Rolfe. 1909
× *P. violacea* = *P.* × *Malacea.* 1970 (Thornton)

Natural Hybrid

Phalaenopsis × Valentinii Rchb.f. in Gard. Chron. n.s. 20:262, 1883, *pro sp.;* Sweet in Amer. Orch. Soc. Bull. 38:515, 1969.

Type: Malaya: Perak. Cultivated by Hugh Low and flowered for the first time on August 15, 1883. Coll. Valentine s.n.! (W).

Plant similar to *P. violacea* Witte, but with somewhat narrower leaves; flowers very fleshy, in appearance similar to *P. violacea* Witte; dorsal sepal elliptic or rhombic elliptic, acute, somewhat concave, dorsally prominently keeled, up to 25 mm. long, up to 11 mm. wide; lateral sepals obliquely ovate-elliptic, acute, prominently keeled dorsally as in *P. violacea* Witte, up to 25 mm. long, up to 12 mm. wide; petals concave, elliptic, acute, dorsally carinate toward tip, up to 18 mm. long, up to 9 mm. wide; lip 3-lobed, fleshy, in character intermediate between *P. violacea* Witte and *P. cornu-cervi* (Breda) Bl. & Rchb.f.; lateral lobes linear-rectangular with fleshy callus in middle, apex subtruncate, confluent with midlobe forming a very shallow, horseshoe-shaped excavation, then sinuously expanding into trulliform midlobe, apex obtuse or rounded and provided with an ovoid glabrous callus, center of disc of midlobe provided with a high elevated keel-like appendage, projecting over it and originating from junction of midlobe and lateral lobes there is a plate-like bidentate fleshy structure; disc between lateral lobes with a fleshy bidentate callus, length of whole lip 15 mm., width across lateral lobes 15 mm.; column fleshy, somewhat arcuate, 10 mm. long; pedicellate ovary 2 cm. long.



Lip of *P.* × *Valentinii* from a specimen collected in the wild.

Distribution: Malay Peninsula: Perak State. In addition to type, living flowers have been studied.

Illustration: Malayan Orch. Rev. 8 (2): color illustration opposite page 49, Dec. 1965 ('Sally Chung').

Observations: Reichenbach offers the following information regarding this putative natural hybrid: "I had it from Messrs. Hugh Low & Co. Its flowers are larger than those of Phalaenopsis cornu-cervi, and smaller than those of P. violacea. The peduncle is said to be terete, and like that of the last-named species. The sepals and petals are purple; petals and lateral sepals white at the base inside with some purple bands. Lip much in the way of that of P. violacea, with a spreading angle at the upper corner of the side lacinia, but with a pandurate exterior lacinia, three-lobed at the top, bearing a thick umbo in the middle. There is a three-toothed lamella at the base of the median lacinia,

Drawing of *P. pantherina* at Kew.

A copy of Reichenbach's watercolor of *P. Boxallii,* a synonym of *P. Mannii.*

Phalaenopsis equestris.

Phalaenopsis equestris var. *leucaspis.*

Phalaenopsis equestris var. *leucotanthe.*

in front of a two-toothed one, leaning on the sword-like blunt appendix. Top of lip mauve and sword-like, appendix half mauve longitudinally, and half white. The remainder of the lip is yellow, part of the side lacinia white, with some purple spots on the upper border and corner. Column yellow with red stripes at the top, purple beneath. Messrs. H. Low & Co. write that the leaves are light green, narrower than those of violacea, without the wavy crispness generally seen with that species. Mr. Day writes me about the novelty; it looks like a cross between cornu-cervi and violacea, and is very pretty. The name is given in honour of its lucky discoverer, Mr. S. H. Valentine."

☆ ☆ ☆

Section **STAUROGLOTTIS** (Schauer) Benth. in Journ. Linn. Soc. 18:332, 1881; Sweet in Amer. Orch. Soc. Bull. 37:873, 1968; *ibid.*, 38:333, 1969.

Basionym: *Stauroglottis* Schauer in Nov. Act. Acad. Nat. Cur. 19, Suppl. 1:432, 1843.

Syn.: Section *Stamoglottis* Grant, Orch. Burma 241, 1895. *Sphalm.*

Sepals and petals similar; lip 3-lobed, the disc between the lateral lobes without any protuberance, at junction of lateral lobes and midlobe with a peltate callus.

Type: *Stauroglottis equestris* Schauer = *Phalaenopsis equestris* (Schauer) Rchb.f.

Key to the Species

1. Leaves green without markings; midlobe of lip with an entire, acute apex.....**P. equestris**

1a. Leaves green with marmorate markings; midlobe of lip with apiculate apex.....2

2. Petals from a cuneate base elliptic-rhombic; callus at base of midlobe of lip 6- to 8-sided .....**P. Lindenii**

2a. Petals transversely reniform-elliptic, sessile; callus at base of midlobe of lip triangular, acuminate .....**P. celebensis**

Enumeration of Species

Phalaenopsis equestris (Schauer) Rchb.f. in Linnaea 22: 864, 1850; Sweet in Amer. Orch. Soc. Bull. 38:333, 1969.

Basionym: *Stauroglottis equestris* Schauer in Nov. Acad. Cur. 19, Suppl. 1, 432, 1843.

Type: Philippines, Luzon Island, Manila. Coll. Meyens s.n.! (W).

Syn.: *Phalaenopsis rosea* Lindl. in Gard. Chron. 671, 1848.

Type: Philippines, Luzon Island, Manila. Coll. Lobb. s.n.! (K,W).

Phalaenopsis Stauroglottis Hort. ex Rollinson, Gen. Cat. 42, 1876. *Nomen.*

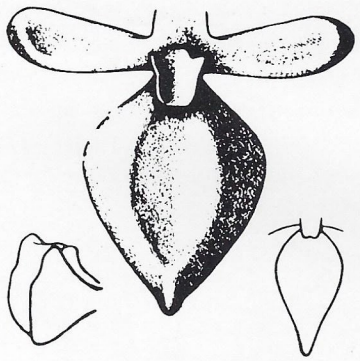
Phalaenopsis rosea var. *deliciosa* Burbidge in The Garden 22:119, 1882.

Type: No specimen preserved.

Phalaenopsis riteiwanensis Masamune in Trans. Nat. Hist. Soc. Formosa 24:213, 1934.

Stauroglottis riteiwanensis Masamune in Trans. Nat. Hist. Soc. Formosa 24:213, 1934 in syn.

Type: Taiwan (Formosa), Syokotosyo (Riteiwan). Coll. Segawa s.n.



Lip of *P. equestris*. Drawn from type.

Epiphytic; roots copious, fleshy, thick, glabrous; stem abbreviated, short, completely enclosed by imbricating leaf sheaths; leaves fleshy, recurved, up to 5, oblong-elliptic to oblong-ovate, rarely elliptic, acute or subobtuse, canaliculate at apex, gradually tapered toward sessile base, up to 20 cm. long, up to 6.5 cm. wide; inflorescence one to several, suberect, arcuate, simple or branched, with a slightly flexuous, purple rachis, many-flowered; bracts rather inconspicuous, to 2 mm. long; flowers rather delicate in texture, quite variable in size and coloration; dorsal sepals oblong-elliptic to ovate-elliptic, acute, margins somewhat recurved, 10-17 mm. long, 5-7 mm. wide; lateral sepals similar to dorsal sepals, somewhat oblique, acute, 10-15 mm. long, 5-8 mm. wide; petals elliptic to rhomboidal, acute or obtuse, margins somewhat recurved, decidedly constricted toward base, 8-15 mm. long, 5-8 mm. wide; lip 3-lobed, lateral lobes oblong-obovate, obtuse or rounded, anterior margins fleshy, midlobe ovate to elliptic or rhomboidal, somewhat concave in middle, acute and fleshy at apex; disc at junction of midlobe and lateral lobes provided with a subquadrate peltate callus, length of whole lip 10-14 mm., width across lateral lobes 10-16 mm.; column terete, somewhat arcuate, up to 9 mm. long; pedicellate ovary 2 cm. long. Chromosome number $2n = 38$.

Distribution: Philippine Islands: Batan, Bohol, Camaguin, Leyte, Luzon, Mindanao, Negros, Panay, Saman; Taiwan, Syokotosyo (Riteiwan) Island, Little Botel, Tobago Island.

PHILIPPINES. Luzon Island. Manila. Coll. Meyens s.n.! (W); Coll. Lobb s.n.! (K,W); Coll. Wallis s.n.! (W); Coll. Loher 583! (AMES,K); Coll. Cuming 2146! (BM,K). Prov.

Bataan, Lamao. Coll. Cuzner 5606! (AMES); Coll. Williams 376! (AMES,NY). Prov. Camarines. Coll. Curran 12283! (AMES); Coll. Alvarez 22628! (AMES). Prov. Llocos Norte. Coll. Ramos 7736! (AMES,US); 27618! (AMES). Prov. Laguna. Coll. Reillo 35! (AMES); Coll. Lyon 18! (AMES). Prov. Rizal, Antipolo. Coll. Ramos s.n.! (AMES,L,NY,P,US). Prov. Tayabas, Mt. Pular, Coll. Ramos 19408! (AMES); Guinayangan. Coll. Escritor 20775! (AMES). Mindanao Island, Lake Lanao. Coll. Clemens 5622! (AMES). Camaquin Island, Mambajao. Coll. Elmer 14247! (AMES,L,P, NY,US). Panay Island, Capiz. Coll. Copeland 200! (AMES). Bohol Island. Coll. McGregor 1235! (AMES,K). TAIWAN (Formosa), Syokotosyo (Riteiwan). Coll. Segawa s.n.

Also living cultivated flowers have been studied.

Illustrations: Paxton Fl. Gard. 2: t. 72, 1852; Warner & Williams Orch. Album 6: t. 268, 1887; Cogn. & Gooss., Dict. Icon. Orch., Phalaenopsis t. 3, 1898 as *P. Esmeralda*; Katoh & Futakuchi, Orchids in Colour, pl. 115, f. 5, 1974.

Observations: *Phalaenopsis equestris* was first described by Schauer in 1843 under the name of *Stauroglottis equestris* from a collection by Meyen from Luzon in the Philippines. Lindley in 1848 in the Gardeners' Chronicle described the same species under the name of *Phalaenopsis rosea* from a collection by T. Lobb from Manila who sent the plants to Messrs. Veitch. Lindley referred to it as the pink butterfly plant. Reichenbach in Linnaea in 1849 made the combination of *Phalaenopsis equestris* under which this species is correctly known today. The species from Taiwan (Formosa) was described under the name of *Phalaenopsis riteiwanensis* by Masamune in 1934, of which I have seen living flowers.

There is also an excellent plate published in the Journal of Geobotany 15: pl. 6, 1966, which together with the original description convinces me that *P. riteiwanensis* is conspecific with *P. equestris*. The island of Syokotosyo, Taiwan, is the northernmost distribution of this species.

This species is very variable in color; commonly the sepals and petals are pale rose or white with rose suffusion, especially along midribs of the floral segments, the lip is usually darker rose with some yellow on the lateral lobes. Varietal names have been assigned to a number of deviations from this color pattern which will be enumerated below.

This is a common and widely distributed species in the Philippines appearing from sea level to 300 meters elevation. The plants flower throughout the year in the wild, but more profusely from February to May.

The plants are known to have keikis, producing new plants from old stems and roots. The old flowering scapes are persistent and are known to produce new branches with flowers season after season.

The green leaves have no silver-grey maculations or marmorations. The rachis is purplish. The midlobe of the lip varies from ovate to elliptic with an acute fleshy apex. Thus, the shape of the midlobe of the lip, the purplish rachis and the green leaves without marmorations are the distinguishing characteristics which differentiate this species from *P. Lindenii.*

It should be mentioned here that plants under the name *P. equestris* 'Fleur de Lys,' awarded by the American Orchid Society as an unusual variety, are merely teratological forms in which the petals assume the shape of the lip. An examination of a photograph of one of these plants which shows marmorate or mottled leaves and also an examination of living flowers from these same plants convinces me that these teratological forms are referable to *P. Lindenii.*

The description of *P. rosea* var. *deliciosa* falls within the normal variation pattern of the species.

The following varieties are known:

Phalaenopsis equestris var. **alba** Hort. in Amer. Orch. Soc. Bull. 36:143, 1967; Sweet in Amer. Orch. Soc. Bull. 38:334, 1969.

Type: Philippines, without precise locality. Cult. Mrs. J. B. Shipley s.n.

Illustration: Amer. Orch. Soc. Bull. 36:144, 1967.

Observations: The original English description reads, "Seven flowers on two spikes; flowers pure white with no apparent trace of color; typical form for species; good texture and substance. Natural spread of flower 1½". . . ."

Phalaenopsis equestris var. **leucaspis** Rchb.f. in Gard. Chron. n.s. 15:688, 1881; Sweet in Amer. Orch. Soc. Bull. 38:335, 1969.

Syn.: *Phalaenopsis rosea* var. *leucaspis* (Rchb.f.) Rolfe in Gard. Chron. n.s. 26:276, 1886.

Type: Philippines, without precise locality. Cult. Barber s.n.! (W).

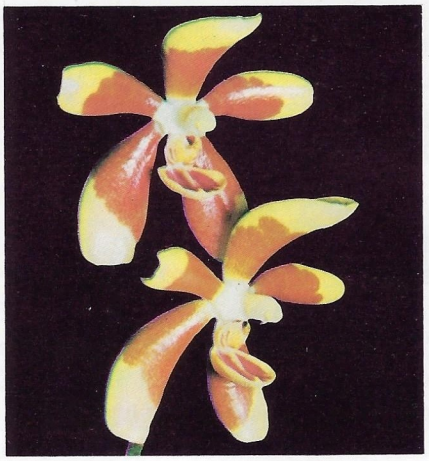
Observations: This is the most common form in the Philippine Islands where it is abundant in the hot valleys along streams on the Island of Luzon.

Phalaenopsis equestris var. *leucaspis* has somewhat smaller flowers. The sepals and petals have a purplish suffusion in the center. The white lateral lobes of the lip have horizontal purple stripes and a pale pink flush at the apices; there are no yellow markings. The midlobe is a rich purple fading toward the base. The peltate callus is white with brown spots.

Phalaenopsis equestris var. **leucotanthe** Rchb.f. ex Godefroy-Lebeuf in L'Orchidophile 3:490, 1883; Sweet in Amer. Orch. Soc. Bull. 38:334, 1969.

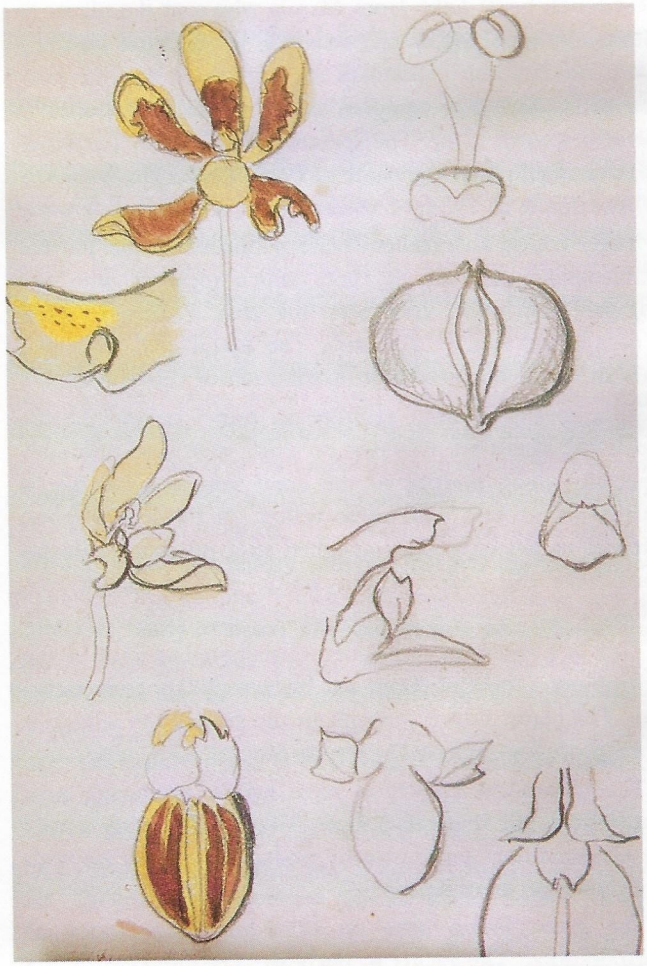
Lectotype: Philippines, without precise locality. Cult. Boddaert s.n. Since no specimen was preserved, the sketches in the Reichenbach herbarium, sheet no. 22208! (W) were selected as the lectotype (Amer. Orch. Soc. Bull. 38:335, 1969).

Phalaenopsis Lindenii 'Malibu'.



Phalaenopsis fuscata.

Phalaenopsis celebensis.



Copy of original watercolor of *P. fuscata* by Reichenbach.

Syn.: *Phalaenopsis rosea* var. *aurantiaca* Gower in The Garden 41:216, 1892.

Type: No specimen preserved.

The flowers are larger, measuring up to 2 in. (5 cm.) across, but usually smaller. Sepals and petals waxy white, occasionally suffused with rose. The midlobe of lip is dark rose and the lateral lobes are white with the base suffused with lemon-yellow, the apex sometimes suffused with pale rose-purple. The remaining part of the midlobe of the lip is a beautiful rich orange. The peltate callus is yellow dotted with brown.

Distribution: Philippines.

PHILIPPINES. Luzon Island, Manila. Coll. Gonzales s.n.! (AMES); Coll. Wallis 62! (W).

Illustrations: Bot. Mag. 86: t. 5212, 1860, as *P. rosea* Lindl.; Phil. Journ. Sci. 52: pl. 2, figs. 7, 8, 1933.

Observations: The plant which was grown by Prof. Boddaert came into the hands of Mr. Godefroy-Lebeuf who wanted to name it in honor of Mrs. Boddaert, but Reichenbach identified it with his undescribed var. *leucotanthe* in his herbarium.

Phalaenopsis rosea var. *aurantiaca* as described by Gower does not differ from *P. equestris* var. *leucotanthe.*

PRIMARY CROSSES

Phalaenopsis equestris (Schauer) Rchb.f.

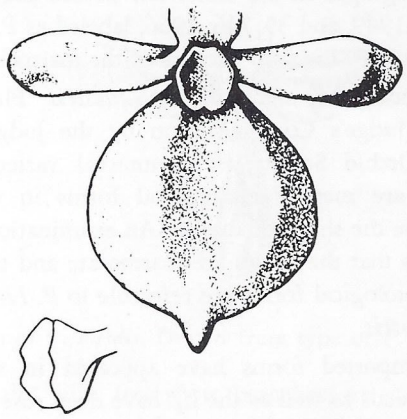
× *P. amabilis* = *P.* × *Artemis.* 1892 (Veitch)
× *P. amboinensis* = *P.* × *Ambotris.* 1970 (Thornton)
× *P. Aphrodite* = *P.* × *Intermedia* Lindl. 1853. (Veitch, 1886)
Syn.: *P.* × M. de Almeida. 1957 (Hung Che-ying)
× *P. cornu-cervi* = *P.* × *Cornustris.* 1967 (Wallbrunn)
× *P. gigantea* = *P.* × Bernice Maskin. 1978 (Wallbrunn)
× *P. Lindenii* = *P.* × Venus. 1923. (Misumi)
× *P. Lueddemanniana* = *P.* × Mahinhin. 1957 (Miller)
× *P. maculata* = *P.* × Little Sister. 1974 (Hager)
× *P. Mannii* = *P.* × Linda Cheok. 1964 (Kim)
× *P. Mariae* = *P.* × Rose Marie. 1961 (Kirsch)
× *P. Parishii* = *P.* × *Partris.* 1965 (Thornton)
× *P. Sanderana* = *P.* × *Rolfeana* Sweet.
Syn.: *P.* × *Hebe* Rolfe. 1897 (Veitch), not Rchb.f. 1862
× *P. Schillerana* = *P.* × *Veitchiana* Rchb.f. (Nat. hybr.) 1872
Syn.: *P.* × *Gertrudae* Quisumb. 1941
P. × *Viratai* Quisumb. 1956
× *P. Stuartiana* = *P.* × Cassandra. 1896 (Veitch)
× *P. sumatrana* = *P.* × *Equitrana.* 1967 (Thornton)
× *P. violacea* = *P.* × *Equalacea.* 1967 (Thornton)

× *Doritis pulcherrima* = × *Doritaenopsis* Purple Gem. 1963 (E. Iwanaga)
× *Kingidium deliciosum* (as *Kingiella philippinensis**) = × *Phalaenidium* New Horizon (as × *Phaliella* New Horizon. 1972, Thornton)
× *Neofinetia falcata* = × *Phalaenetia* Irene. 1975 (Sagawa)
× *Renanthera monachica* = × *Renanthopsis* Yuyake. 1963 (H. Iwanaga)
× *Vanda spathulata* = × *Vandaenopsis* Launa Ellen Thornton. 1970 (F. L. Thornton)

Phalaenopsis Lindenii Loher in Journ. Orch. 6:103, 1895; Sweet in Amer. Orch. Soc. Bull. 38:335, 1969.

Type: Philippines, Luzon Island. Coll. Loher 5384! (K).

Epiphytic, pendent; roots fleshy, somewhat flexuous, glabrous; stem very short, completely enclosed by imbricating leaf sheaths; leaves green, mottled silvery white, oblong-lanceolate to oblong-oblanceolate, rarely oblong-elliptic, acute or obtuse at the unequal subbilobed apex, up to 25 cm. long, up to 4 cm. wide; inflorescence slender,



Lip and callus of *P. Lindenii.* Drawn from type.

green, simple or occasionally branched, many-flowered on a slightly flexuous rachis; bracts inconspicuous, 1-2 mm. long; flowers delicate; dorsal sepal oblong-elliptic, obtuse or rounded, 16 mm. long, 7 mm. wide; lateral sepals oblong-ovate, acute, dorsally toward apex slightly carinate, 15 mm. long, 8 mm. wide; petals from a cuneate base elliptic-rhombic, acute or subobtuse, 14 mm. long, 8 mm. wide; lip 3-lobed, lateral lobes oblong-ovate to ligulate, rounded with fleshy anterior margins, midlobe orbicular, slightly concave in center, apiculate at apex; disc at junction of midlobe and lateral lobes is provided with a 6- to 8-sided peltate callus, length of lip 14 mm., width across lateral lobes 18 mm., column cylindric, somewhat arcuate, 10 mm. long; pedicellate ovary up to 3.5 cm. long.

Distribution: Philippine Islands.

PHILIPPINES. Luzon Island. Coll. Loher 5384! (K). Prov.

* = *Kingidium deliciosum* (Rchb.f.) Sweet, *fide* P. F. Hunt in Amer. Orch. Soc. Bull. 40:1094, 1971.

Benguet, Baguio. Coll. Curran 5121! (AMES); Coll. Lyon 39! (AMES); Coll. Williams no. 1947 bis! (NY).

Also cultivated living flowers have been studied.

Illustrations: Orchis 1:83, fig. 37, 1907; Phil. Journ. Sci. 77: pl. 1, 1947; Katoh & Futakuchi, Orchids in Colour, pl. 115, fig. 2, 1974.

Observations: Flowers are whitish suffused with light rose and with a few rose-colored dots at base of sepals and petals. The midlobe of the lip is amethyst-rose at apex, with five to seven radiating darker rose-colored lines shading into brownish at base. The erect side lobes are white with minute orange dots at the base and three purple lines above. The column is purple.

This species is readily distinguished from *P. equestris* by the green leaves mottled with silvery white, the green rachis and the orbicular and apiculate midlobe of the lip. It has been suggested that it may be a natural hybrid between *P. equestris* and *P. Schillerana.* This assumption is obviously based on the similarity of the coloration of the leaves in both of these species.

The photographs in the American Orchid Society Bulletin 18:747, 1949, and 35:746, 1966, labeled as *P. equestris,* are referable to *P. Lindenii* because of the marmorate leaves.

Plants under the name of *P. equestris* 'Fleur-de-Lys' awarded a Judge's Commendation by the judges of the American Orchid Society as an unusual variety, as was mentioned, are merely teratological forms in which the petals assume the shape of the lip. An examination of these plants shows that the leaves are marmorate and the flowers of these teratological forms are referable to *P. Lindenii* and not *P. equestris.*

A few imported forms have appeared in which the sepals and petals as well as the lip have deep rose stripes or "peppermint stripes." One of these, especially *P. Lindenii* 'Malibu', H.C.C./AOS has been used in breeding to obtain hybrids with highly sought-after peppermint-colored striping.

Primary Crosses

Phalaenopsis Lindenii Loher

× *P. amboinensis* = *P.* × Wanda Williams. 1967 (Wallbrunn)
× *P. cornu-cervi* = *P.* × *Lincervi.* 1967 (Thornton)
× *P. equestris* = *P.* × Venus. 1923 (Misumi)
× *P. Lueddemanniana* = *P.* × Sunfire. 1964 (Miller)
× *P. maculata* = *P.* × Li'l Bit. 1970 (Jones & Scully)
× *P. Mariae* = *P.* × Marie Linden. 1975 (Moir)
× *P. Sanderana* = *P.* × Robert W. Miller. 1960 (Miller)
× *P. Schillerana* = *P.* × Baguio. 1966 (Moir)
× *P. Stuartiana* = *P.* × Batangas. 1979 (Thornton's Orchids)
× *P. violacea* = *P.* × Vilind. 1969 (Kirch: E. Iwanaga)

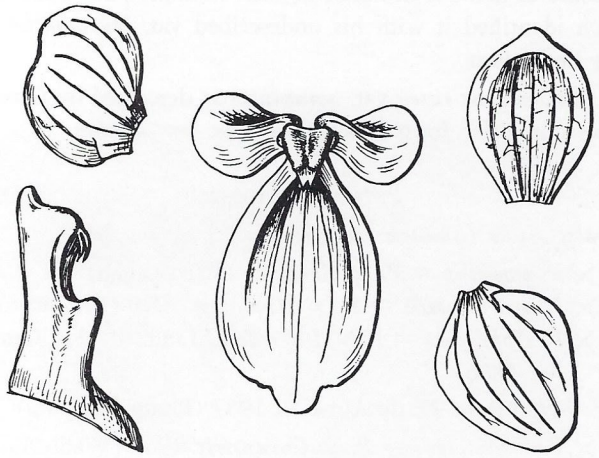
× *Doritis pulcherrima* = × *Doritaenopsis* Asahi. 1923 (Iwasaki)

× *Kingidium deliciosum* (as *Kingiella philippinensis**) = × *Phalaenidium* Pale Face (as × *Phaliella* Pale Face. 1970, Thornton)

Phalaenopsis celebensis Sweet, *sp. nov.*

Type: Celebes, without precise locality. Introduced and cultivated by Karthaus & Dakkus s.n.! February 5, 1934 (BO), and drawings by J. J. Smith at Leiden, Holland.

Herba epiphytica, pendens; radicibus carnosis; caulibus abbreviatis, vaginis foliorum omnino obtectis; foliis paucis, viridibus, argenteo-marmoratis, obovato-oblongis, obtusis vel rotundatis, subsessilibus, usque ad 17 cm. longis, 6 cm. latis; pedunculo arcuato-pendenti, remote 5-vaginato, usque ad 40 cm. longo; rhachide subdense multifloro, usque ad 13 cm. longo; bracteis minutis, inconspicuis; floribus speciosis, albidis, basin lilacino striatis; sepalo postico erecto, suborbiculato-spathulato, concavo, obtuso, usque ad 13 mm.



Floral details of *P. celebensis* after J. J. Smith.

longo, 9.6 mm. lato; sepalis lateralibus patentibus, oblique ovatis, obtusis vel rotundatis, usque ad 14 mm. longis, 9.6 mm. latis; petalis incurvis, transverse reniformi-ellipticis, retusis, usque ad 9 mm. longis, 11.5 mm. latis; labello 3-lobo, lobis lateralibus vitellinis, suborbiculari-spathulatis, in medio transverse carinatis, usque ad 4.6 mm. longis, 3.2 mm. latis; lobo intermedio concavo, ovato-elliptico, apiculato, usque ad 9.5 mm. longo, 6 mm. lato; callo triangulari, acuminato, margine eroso; columna erecta, usque ad 8 mm. longa; ovario pedicellato tereti, usque ad 2.6 cm. longo.

Epiphytic pendent plants with fleshy roots; stem very short, completely enclosed by imbricating leaf sheaths; leaves few, green, silvery white marmorate, obovate-oblong, obtuse or rounded, subsessile, up to 17 cm. long, 6 cm. wide; peduncle arcuately pendent, remotely 5-sheathed, up to 40 cm. long, terminated by a dark purple-green rachis of 13 cm. length; rachis subdensely many-flowered; bracts small,

* = *Kingidium deliciosum* (Rchb.f.) Sweet, *fide* P. F. Hunt in Amer. Orch. Soc. Bull. 40:1094, 1971.

inconspicuous; flowers showy, white with bright lilac stripes at base; dorsal sepal erect, suborbicular-spathulate, concave, obtuse, up to 13 mm. long, 9.6 mm. wide; lateral sepals spreading, obliquely ovate, obtuse to rounded, up to 14 mm. long, 9.6 mm. wide; petals incurved, transversely reniform-elliptic, retuse, up to 9 mm. long, 11.5 mm. wide; lip 3-lobed, lateral lobes vitelline, suborbicular-spathulate with a fleshy ridge in middle, up to 4.6 mm. long, 3.2 mm. wide; midlobe concave, ovate-elliptic, apiculate, up to 9.5 mm. long, 6 mm. wide; at the joint of middle and terminal lobes there is a triangular, acuminate callus with somewhat erose margins; column erect, up to 8 mm. long; pedicellate ovary terete, up to 2.6 cm. long.

Observations: This is the first record of the Section *Stauroglottis* outside of the Philippines. *Phalaenopsis celebensis* is reminiscent of *P. Lindenii,* but the shape of the sepals and petals, as well as the form of the callus easily separate the two from one another.

Since the description was prepared I have seen color photographs and living material of this species from Herman J. A. ter Borch, Holland, and A. Kolopaking and C. L. Bundt, Indonesia. Mr. ter Borch and C. L. Bundt have also provided fresh plants and flowers for study.

☆ ☆ ☆

Section **FUSCATAE** Sweet in Amer. Orch. Soc. Bull. 37: 873, 1968; *ibid.* 38:505, 1969.

Sepals and petals similar, spreading; margins recurved; lip continuous with column-foot; midlobe of lip concave or flat, with one to several keels or ridges; central keel always fleshy.

Type: *Phalaenopsis fuscata* Rchb.f.

Observations: There has been considerable confusion concerning the identity of the species referable to this section. This confusion or rather misunderstanding was in part due to the superficial similarity of the flowers, especially their color, and to the fact that Reichenbach's herbarium was inaccessible under the terms of his will for 25 years following his death in 1889. Consequently J. J. Smith (Bull. Jard. Bot. Buitenz, ser. 3, 9:488, 1928) united *P. Forbesii, P. Kunstleri* and *P. viridis* with *P. fuscata.* An examination of the type collections, however, has shown them sufficiently distinct to reconsider their original status.

KEY TO THE SPECIES

1. Rachis fusiformly thickened; lip with violet stripes ..... **P. viridis**
1a. Rachis not thickened; lip with brownish or cinnamon stripes 2
2. Column slender, cylindric, calli between lateral lobes of lip originate in center ..... **P. fuscata**
2a. Column short, squatty, constricted in middle; calli between lateral lobes of lip originate from base.... 3
3. Sepals and petals with large brownish or cinnamon blotches; midlobe of lip flat, with a high, fleshy median keel ..... **P. Kunstleri**
3a. Sepals and petals with small brownish blotches at base; midlobe of lip cochleate with five parallel low ridges ..... **P. cochlearis**

ENUMERATION OF SPECIES

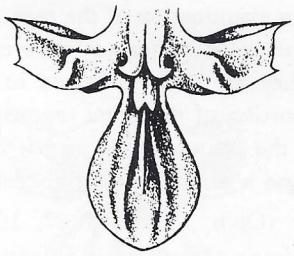
Phalaenopsis viridis J. J. Smith in Bull. Dept. Agri. Ind. Néerl. 5:21, 1907; Sweet in Amer. Orch. Soc. Bull. 38:505, 1969.

Type: Sumatra. East Coast, Deli. Coll. Heldt s.n.! (BO).

Syn.: *Phalaenopsis Forbesii* Ridl. in Jour. Bot. 63: Suppl. 118, 1925.

Type: Sumatra. Hills near Paoe, Palembang. Coll. Forbes 2521! (BM).

Epiphytic; roots copious, flexuous, fleshy, glabrous; stem very short, completely enclosed by imbricating leaf sheaths; leaves 3-4, shiny, leathery, coriaceous, oblong-ovate or elliptic-oblong, acute or subobtuse, tapered toward base, up to 30 cm. long, up to 8 cm. wide; inflorescence 1-2, simple,



Lip of *P. viridis*. Drawn from type of *P. Forbesii*.

occasionally with few short branches, up to 40 cm. long with loosely flowered incrassate but not complanate rachis; bracts persistent, ovate-cucullate, acute, 3 mm. long; flowers fleshy with spreading segments, up to 7 open simultaneously; dorsal sepal oblong-elliptic or elliptic, obtuse, margins revolute, 15-20 mm. long, 7-9 mm. wide; lateral sepals similar to dorsal sepal, except somewhat oblique, dorsally costate toward apex, acute, 15-17 mm. long, 8-9 mm. wide; petals elliptic or ovate-elliptic, acute, dorsally subcostate at apex, margins lightly undulate, 12-16 mm. long, 5-8 mm. wide; lip short-clawed, 3-lobed; lateral lobes obliquely rectangular with truncate apex, horizontally provided with fleshy ridge, below with a fleshy callus near base; midlobe from a cuneate base ovate or subrhombic, acute or rounded at apex, flat or somewhat concave, longitudinally provided with 2 fleshy ridges on either side of fleshy median keel; disc between lateral lobes provided with a pair of fleshy approximate plate-like calli with divergent apices, in front of which at junction of midlobe and lateral lobes there is another fleshy bidentate projection, length of whole lip 10 mm., width across lateral lobes 10 mm.; column fleshy, cylindric, constricted in middle, up to 8 mm. long; pedicellate ovary up to 2 cm. long.

Distribution: Sumatra.

SUMATRA. Hills near Paoe, Palembang. Coll. Forbes 2521! (BM); Coll. Forbes 2210! (BM). East Coast, Deli. Coll. Heldt 27! (BO).

Illustrations: Orch. Digest 40:88, 1976; *ibid.,* 41:177, 1977.

Observations: This species was described by J. J. Smith from a specimen collected by Heldt near Deli on the northeast coast of Sumatra. *Phalaenopsis Forbesii* was also collected by Forbes in the hills near Paoe, Palembang in southeast Sumatra.

The sepals and petals are a greenish yellow with various reddish brown blotches, which at times leave the edges of the sepals and petals showing the ground color. The column and lip are white with four violet-purple stripes, two on each side of the fleshy median keel of the midlobe. The calli on the lateral lobes are yellow. The column is more like that of *P. fuscata,* cylindric, elongate and somewhat constricted in the middle.

J. J. Smith (Bull. Jard. Bot. Buitenz. ser. 3, 9:488, 1928) united this species with *P. fuscata* on account of the similarity of color. An examination of the type, however, reveals that not only the color pattern is different in these two taxa, but also they are quite different in morphology, as well as the proportion of the floral segments. Furthermore, the structure of the column of *P. viridis* is quite different from *P. fuscata* and is somewhat reminiscent of *P. Kunstleri.*

J. B. Comber (Orch. Digest 40:87, 1976) writes that north of the Sinabung Mountains in Sumatra, "Picking one's way higher up between the limestone rocks near the top of the ridge, a whole new spectrum of orchids takes over, each one having found its spot according to its needs. Where it is darker, often on the rock face itself, both *Phalaenopsis fimbriata* with its wavy leaves and *P. viridis* with its huge flat leaves can be found, sometimes one species growing almost on top of the other. While *P. fimbriata* flowers frequently, *P. viridis* is usually found with long-branched flowerless spikes. It is only when the right stimulus stimulates that all the plants in the area extend their inflorescences further and produce flushes of the greenish-brown-on-white flowers. These two *Phalaenopsis* species grow both on the rocks and also low down on trees, at an elevation of 850 m. Yet when they are both taken for cultivation to 1,300 m., *P. viridis* cannot survive more than a few weeks, while *P. fimbriata* thrives and flowers. The opposite occurs when they are both taken down to sea level; *P. fimbriata* is most unhappy, becoming smaller and refusing to flower, while *P. viridis* grows well."

PRIMARY CROSSES

Phalaenopsis viridis J. J. Smith

× *P. cornu-cervi* = *P.* × Ibu Kasman. 1978 (Kolopaking)

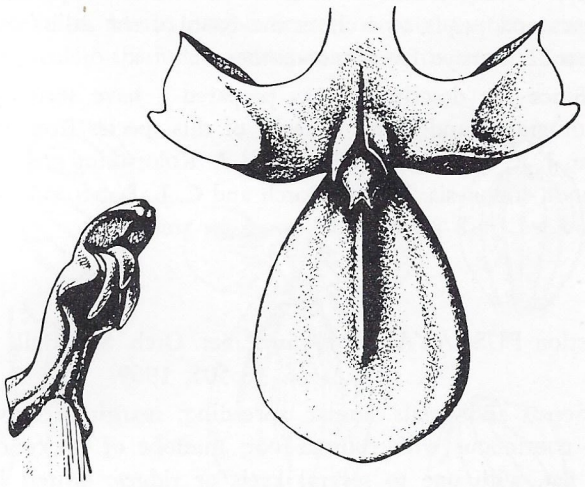
Phalaenopsis fuscata Rchb.f. in Gard. Chron. n.s. 2:6, 1874; Sweet in Amer. Orch. Soc. Bull. 38:507, 1969.

Type: Malay Peninsula, without precise locality. Cult. Bull. s.n.! (W).

Syn.: *Phalaenopsis Denisiana* Cogn. in Gard. Chron. ser. 3, 26:82, 1899.

Type: Philippine Islands without precise locality. Introduced in 1897. Cult. M. Fernald Denis s.n.! (BR).

Epiphytic; roots slightly flexuous, glabrous; stem short, completely enclosed by imbricating leaf sheaths; leaves spreading, deflexed, from a cuneate base obovate-oblong, acute, up to 30 cm. long, up to 10 cm. wide; inflorescence



Lip and column of *P. fuscata.*

suberect, arcuate, simple or branched, rather stout, few flowered, occasionally with up to 12 flowers, as long as or longer than leaves; flowers fleshy, with spreading segments; dorsal sepal ovate or ovate-elliptic, obtuse, rarely acute with revolute margins, 14-17 mm. long, 7-10 mm. wide; lateral sepals from an oblique base, elliptic, obtuse, margins revolute, 14-17 mm. long, 7-11 mm. wide; petals obovate-oblong to elliptic-oblong, obtuse, margins revolute, 12-15 mm. long, 6-8 mm. wide; lip fleshy, 3-lobed; lateral lobes subquadrate, somewhat falcate with a truncate apex; midlobe ovate or elliptic, fleshy, flat with a fleshy, heavy, median keel; disc at junction of midlobe and lateral lobes provided with a fleshy bifurcate appendage, superimposed upon it there is another biparted, fleshy callus blending into main tissue of disc in about the center, length of whole lip 11-14 mm., width across lateral lobes 10-14 mm.; column erect, fleshy, cylindric, 7-8 mm. long; pedicellate ovary up to 3 cm. long.

Distribution: Malay Peninsula, Borneo, and Philippine Islands.

MALAY PENINSULA. State unknown. Coll. Bull. s.n.! (W); Pahang State, Tembeling. Coll. Carr 172! (K): Kota

Glanggi. Coll. Henderson 22521! (K). BORNEO. West Koetai. Coll. Endert 2565! (BO). PHILIPPINE ISLANDS. Without precise locality. Coll. Denis s.n.! (BR). Also living cultivated flowers have been studied.

Illustrations: Cogn. & Gooss., Dict. Icon. Orch. Phalaenopsis t. 6, 1899 as *P. Denisiana* Cogn.

Observations: Reichenbach described this species from a specimen cultivated by Mr. Bull in England and stated it was introduced originally from the Malayan Peninsula, which is substantiated by all of the other collectors I have examined with one exception from East Borneo. However, in the Day Collection of drawings in the orchid herbarium at Kew, there is a watercolor of the original plant with a note by Day that, "This was drawn at Mr. Bull's. It was imported by him from the Philippine Islands."

Later in 1899, Fernald Denis, an amateur orchid grower at Vancluse, France, introduced a variant of *P. fuscata* from the Philippines. It was described by Cogniaux in the Gardeners' Chronicle as *P. Denisiana* and illustrated in the same year in Cogniaux and Goossens, Dict. Icon. Orchid. Phalaenopsis t. 6. However, it is possible that some time in the future *P. Denisiana* may be reinstated again as a species distinct from *P. fuscata* pending further material and more information on its biology. For the present it is considered a synonym of *P. fuscata* because the structure of the column, the size and color of its flowers are nearly identical with *P. fuscata.* The above-mentioned variation differs in the position of the callus of the lip.

The flowers of *P. fuscata* have a yellow ground color with the basal half to two-thirds of the sepals and petals covered with a large brown blotch. The lip is also marked with brown.

The claw and the disc between the lateral lobes of the lip are rather thin and wanting of elevated fleshy ridges which in *P. Kunstleri* are prominent and extend from the base almost to the junction of the midlobe and lateral lobes. The column is slender, elongate and more or less cylindric without any noticeable pedestal-like dilation towards the base. See the ink drawings.

Phalaenopsis fuscata has been confused with a number of other species in this section, namely *P. Kunstleri, P. Forbesii* and *P. viridis.* This confusion is readily understandable provided the superficial resemblances of these species to one another in gross habit and in the coloration of the flowers are the only criteria used for differentiation.

PRIMARY CROSSES

Phalaenopsis fuscata Rchb.f.

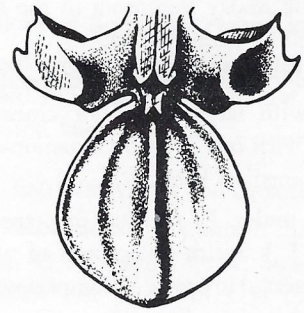
× *P. amabilis* = *P.* × *Fuscatalis.* 1968 (Minne)
× *P. fasciata* = *P.* × Mirth. 1977 (Hager)
× *P. Lueddemanniana* = *P.* × *Lucata.* 1967 (Thornton)
× *P. Mannii* = *P.* × *Mannicata.* 1966 (Kuhn)
× *P. Mariae* = *P.* × Golden Jewel. 1973 (Dobkin)
× *P. Stuartiana* = *P.* × Zuma's Angelita. 1978 (Zuma Canyon)

Phalaenopsis Kunstleri Hook.f. in Fl. Brit. Ind. 6:30, 1890; Sweet in Amer. Orch. Soc. Bull. 38:508, 1969.

Type: Malaysia. Perak. Coll. Kunstler s.n.! (CAL,K).

Syn.: *Phalaenopsis fuscata* var. *Kunstleri* (as var. *hurstleri*), *nomen nudum* in Orch. Rev. 75: index p. 10, 1967.

Epiphytic; roots fleshy, flexuous, glabrous; stem short, completely enclosed by imbricating leaf sheaths; leaves 2-4, shiny, fleshy, pendent, obovate or oblanceolate, rarely oblong-elliptic, acute or subobtuse, 10-24 cm. long, 4-8 cm. wide; inflorescence arcuate, suberect, simple or with several short branches, up to 40 cm. long; rachis short, all-sided; bracts ovate-triangular, cucullate, acute, 4-5 mm. long; flowers fleshy, with spreading segments, several open simultaneously; dorsal sepal obovate to elliptic, obtuse or slightly emarginate, dorsally under apex slightly incrassate, margins revolute; 20 mm. long, 10 mm. wide; lateral sepals similar to dorsal sepal, dorsally distinctly carinate, margins completely revolute, 20 mm. long, 11 mm. wide; petals elliptic,



Lip and column of *P. Kunstleri.* Drawn from living specimen.

obtuse or rounded, 15 mm. long, 8 mm. wide; lip 3-lobed, fleshy; lateral lobes subquadrate, semifalcate with an obliquely truncate apex and provided with a callus in center; midlobe suborbicular, rounded in front, flat or slightly cochleate with a prominent fleshy median keel; disc between lateral lobes provided with a pair of fleshy ridges diverging at apex, in front of which there is a short bidentate callus at junction of midlobe and lateral lobes; length of whole lip 10-12 mm., width across lateral lobes 10 mm.; column very fleshy, short, constricted in middle and suddenly dilated into a short stout base, up to 9 mm. long; pedicellate ovary up to 2 cm. long.

Distribution: Burma; Malay Peninsula, Johore, Perak. BURMA. Falam, Chin Hills. Coll. Daun 38! (K). MALAY PENINSULA. Perak State. Coll. Kunstler s.n.! (CAL,K); Ipoh. Coll. Ridley s.n. (SING); Tapah. Coll. Curtis s.n. (SING); Dindings. Coll. Curtis s.n. (SING). Johore State. Without precise locality. Coll. Ridley 13217! (K).

Illustrations: Ann. Roy. Bot. Gard. Calcutta 5: t. 58, 1895; Bot. Mag. 129: t. 7885, 1903; Amer. Orch. Soc. Bull. 35:752, 1966 as *P. fuscata;* Orch. Dig. 40:88, 1976.

Observations: The original material was collected by Kunstler in Perak on the Malay Peninsula and was described by Hooker in 1890. It has been reported from the western part of the Malay Peninsula in the states of Perak and Johore, as well as from Burma.

The ground color of the sepals and petals is yellow or greenish yellow with large brown or cinnamon blotches. The lip is yellow with one or two cinnamon-colored stripes on either side of median keel.

As mentioned under *P. fuscata,* this species has been united with it by J. J. Smith on account of superficial similarities of the flowers. However, a comparison of the shape of the lip and column readily differentiates the two. The disc between the lateral lobes of the lip of *P. Kunstleri* is provided with a pair of fleshy ridges extending from the base almost to the junction of the midlobe and lateral lobes. In *P. fuscata* the basal portion of the disc is devoid of callosities; they originate in the middle and project with their free apices beyond the junction of the midlobe and lateral lobes. The column of *P. Kunstleri* is a short, squatty structure constricted in the middle; from this constriction it suddenly expands into a pedicel-like base. The same structure in *P. fuscata* is an elongate, slender, cylindrical body without any noticeable dilation towards its base.

The illustration in the Botanical Magazine, t. 7885, represents a form of *P. Kunstleri* which I have observed only once. This form is represented by a rather remotely flowered flexuous rachis, quite unlike any other wild collected specimens. The fact is that this condition is not only an accurate interpretation of the artist, but it is a true representation of a plant as documented by an herbarium specimen preserved in the collection of the Royal Botanic Garden, Kew, England. Whether or not this form is worthy of recognition can be decided only when more material is available for study.

Phalaenopsis Kunstleri appears to hybridize with other species of the genus in nature as is evident from the following note by Burkill (Gard. Bull. Str. Settl. 2:46, 1918): "On May 4th, 1917, Mr. B. K. Saheb brought to the Botanic Gardens for opinion a flowering Phalaenopsis which he had obtained in the north of the Peninsula along with *P. sumatrana.* In foliage it exactly resembled *P. sumatrana,* but the flowers were white with a slight green flush, and marked sparingly with chocolate-brown. The colouring thus was as in *P. Kunstleri* Hook.f. but in shape it exactly resembled *P. sumatrana,* while upon the white petals and sepals the shape of the markings were as in *P. sumatrana* Korth., though they were much less abundantly present. The sepals and side petals had rather the shape of those of *P. Kunstleri,* being shorter and more ovate than in *P. sumatrana.* Altogether there appeared in the specimen a certain amount of evidence for regarding it as a natural hybrid between the two named."

To link up *P. Kunstleri* with *P. fuscata* at the varietal level has been suggested recently, but no such combination has been published.

Phalaenopsis cochlearis Holttum in Orch. Rev. 72:408, 1964; Sweet in Amer. Orch. Soc. Bull. 38:509, 1969.

Type: Sarawak. Without precise locality. Coll. Kho s.n.! Cult. at Royal Botanic Garden, Kew. (K).

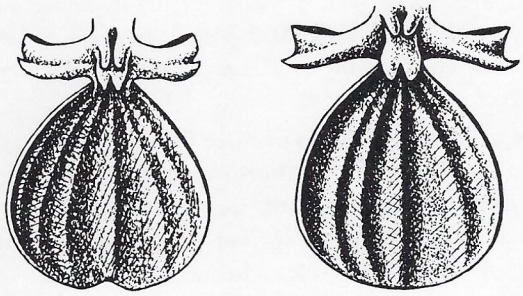
Epiphytic; roots copious, fleshy, laterally compressed, flexuous, glabrous; stem prominent, short, completely enclosed by imbricating leaf sheaths; leaves 2-4, rather thin, recurved, oblong-obovate to oblong-elliptic, acute or subobtuse, on upper surface with 5 slightly raised longitudinal veins on each side of midrib, up to 22 cm. long, up to 8 cm. wide; inflorescence to 50 cm. long, suberect, branched, branches short, up to 6 cm. long, with a fractiflex, few-flowered rachis; bracts ovate-cucullate, up to 5 mm. long; flowers rather delicate, with spreading floral segments; dorsal sepal narrowly elliptic or lanceolate-elliptic, obtuse, dorsally submucronate, up to 20 mm. long, 6-8.5 mm. wide; lateral sepals obliquely ovate, acute, margins revolute, dorsally, especially toward apex, distinctly carinate, 22 mm. long, 6-7 mm. wide; petals narrowly elliptic or lanceolate-elliptic, acute, dorsally subcarinate toward apex, up to 18 mm. long, 4-5 mm. wide; lip 3-lobed, fleshy; lateral lobes oblong-linear, with horizontal groove in center, notched at apex, midlobe suborbicular, strongly cochleate, rounded or emarginate at apex; disc provided with five parallel shallow ridges; disc between lateral lobes with a pair of parallel fleshy lamella-like calli, in front of which there is a bidentate fleshy callus; length of whole lip 9-12 mm., width across lateral lobes 8-10 mm.; column cylindric, fleshy, constricted in middle, up to 7 mm. long; pedicellate ovary up to 2 cm. long.

Distribution: Sarawak.

SARAWAK. Coll. Kho s.n.! (K); Collector unknown 21058! (W). Also living cultivated flowers have been studied.

Illustrations: Orch. Rev. 72: fig. 218, 1964; Malay. Orch. Rev. 7 (no. 5): 52, 1964; Amer. Orch. Soc. Bull. 40:774 (in color), 1971; Orch. Dig. 40:88, 1976.

Observations: This species is one of the latest additions to the genus and was described by Holttum in 1964 from a plant in cultivation at Kew. The original plants, sent to



Lip of *P. cochlearis.*

Kew, were collected in Sarawak by Robert Kho of Kuching where they were reported growing on trees in a limestone area at an elevation of 1,500-2,000 feet. The flowers, which are rather small, vary in color from a white to pale greenish yellow to yellow with two light brownish or orange-brown bars at the base of the sepals and petals. The lateral lobes of the lip are white or cream-colored with three broken cinnamon-colored to orange-brown streaks on the forward facing surfaces. The midlobe is primrose-yellow with several red-brown to orange-brown stripes on each side of the median keel. The dorsal sepal may be up to 20 mm. long and the lateral sepals up to 22 mm. long; the petals up to 18 mm. long. The midlobe of the lip is suborbicular, strongly cochleate (hence the derivation of the specific name), and rounded or emarginate at the apex. The disc of the lip has five parallel, rather shallow ridges.

The earliest-known specimen collected during the late 1800s in the wild is in the Reichenbach Herbarium, no. 21058, by an unknown collector and has a colored drawing of the flower. Almost a hundred years had passed before specimens were gathered again and the species became known to science. Today the species is common in cultivation.

Primary Crosses

Phalaenopsis cochlearis Holttum

× *P. amboinensis* = *P.* × *Amblearis.* 1972 (Wallbrunn)

× *P. cornu-cervi* = *P.* × Golden Bantam. 1970 (Wallbrunn)

× *P. fasciata* = *P.* × Golden Jubilee. 1975 (Dobkin)

× *P. violacea* = *P.* × Little Darlin'. 1969 (Jones & Scully)

☆ ☆ ☆

Section **AMBOINENSES** Sweet in Amer. Orch. Soc. Bull. 37:874, 1968; *ibid.* 38:325, 1969.

Flowers rotuliform; petals broadly elliptic, i.e., length is twice or less than width; the midlobe of lip fleshy, always convex with a single thin median keel.

Type: *Phalaenopsis amboinensis* J. J. Smith.

Key to the Species

1. Sepals and petals with prominent cinnamon-red transverse bars; midlobe of lip with a medium keel, its edge double and serrated.....**P. amboinensis**

1a. Sepals and petals either devoid of markings or with numerous irregular small spots; midlobe of lip, if keeled, the keel with an entire edge.....2

2. Sepals and petals with longitudinal stripes composed of spots; disc between lateral lobes with one oblong-linear retrorse appendage .....**P. javanica**

2a. Sepals and petals without broken stripes; disc between lateral lobes without retrorse appendage 3

3. Sepals and petals spotted; midlobe of lip glabrous.....4

3a. Sepals and petals without spots; midlobe of lip densely covered with coarse hairs.....**P. Micholitzii**

4. Disc between lateral lobes of lip with one bifurcate callus; midlobe of lip with a central keel....**P. gigantea**

4a. Disc between lateral lobes of lip with one pair of superimposed biparted calli; midlobe of lip without central keel .....**P. Robinsonii**

Enumeration of Species

Phalaenopsis amboinensis J. J. Smith in Bull. Dep. Agric. Ind. Néerl. 45:23, March 1911; Sweet in Amer. Orch. Soc. Bull. 38:325, 1969.

Type: Molucca Archipelago: Ambon. Coll. Lach de Bère s.n.! (BO,AMES), cultivated in Botanical Garden, Bogor, Indonesia (Java).

Syn.: *Phalaenopsis psilantha* Schltr. in Fedde, Rep. 10: 193, Dec. 1911.

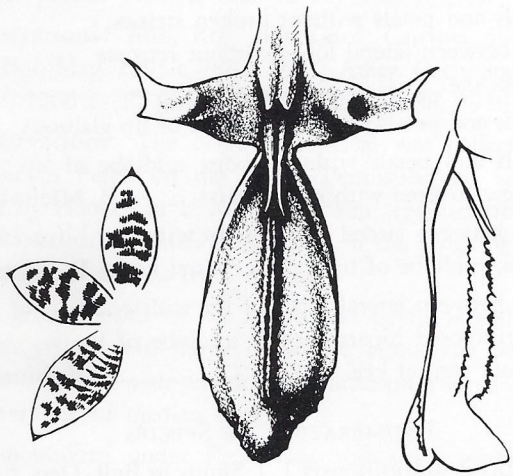
Type: Celebes, District Toli-Toli, Djangdjang. Coll. Schlechter 20667! (AMES).

Phalaenopsis Hombronii Finet in Notulae Systematicae 2:253, 1912.

Type: Molucca Archipelago: Ambon. Coll. Hombron 1841! (P).

Epiphytic; roots coarse, elongate, somewhat flexuous, fleshy; stem rhizomatous, ascending, completely enclosed by imbricating leaf sheaths; leaves 1-4, fleshy, elliptic to oblong-elliptic, obovate or oblanceolate, rounded at apex, tapering toward conduplicate base, up to 25 cm. long, up to 10 cm. wide; inflorescence one to several, arcuate, racemose or subpaniculate, commonly few-flowered, rachis fractiflex, much longer than subtending leaves, up to 45 cm. long; bracts ovate-cucullate, acute, dorsally carinate, up to 7 mm.

long, much shorter than pedicellate ovaries; flowers produced in succession, rather delicate in texture with spreading segments; dorsal sepal elliptic or ovate-elliptic, acute or subobtuse, dorsally carinate towards tip, 20-30 mm. long, 10-15 mm. wide, lateral sepals oblique, broadly ovate or ovate-elliptic, acute or subobtuse, dorsally carinate especially toward apex, 22-30 mm. long, 10-15 mm. wide; petals somewhat oblique, ovate or rhombic-ovate, acute or obtuse, somewhat shorter than sepals; lip 3-lobed with distinct claw; lateral lobes oblong-ligulate with falcate apex, in middle provided with cushion-like callus; midlobe ovate or oblong-ovate to oblong-elliptic, fleshy, concave, glabrous, in center provided with fleshy, high keel with a double edge, both edges serrated, running from base to tip where it merges with a high tubercle-like callus; the disc between lateral lobes provided with a pair of superimposed bifid calli, the anterior of which is acicular and much surpassing



Floral details of *P. amboinensis*. Drawn from type.

the junction of the midlobe and lateral lobes; whole lip 20-22 mm. long, width across lateral lobes 16-18 mm.; column fleshy, cylindric, arcuate, up to 8 mm. long; pedicellate ovary 3 cm. long. Chromosome no. 2n=38.

Distribution: Molucca Archipelago: Ambon, West Seran, Southeast Seran, South Seran. Recently reported from Sulawesi Island (Celebes).

SERAM. Mililia. Coll. Rutten 1633! (L); Tana. Coll. Rutten 2048! (L); Wai Takoeman. Coll. Thornassi under Rutten 1006! (L). AMBON. Coll. Lach de Bère s.n.! (AMES,BO, L); Coll. Doleschal II, 259! (W); Coll. Hombron 1841! (P). CELEBES. District Toli-Toli, Djangdjang. Coll. Schlechter 20667! (AMES). Also many living cultivated flowers have been studied.

Illustrations: Bull. Jard. Bot. Buitenz. ser. 3, suppl. 3: t. 120, fig. 2, 1928; Die Orchidee 5:203, 1936; Orch. Digest 36:88, 1972; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 7, 1974.

Observations: The flowers of *Phalaenopsis amboinensis* may have an off-white ground color to cream to lemon-yellow and even an orange-yellow. Some may have a greenish tinge on the apical portions of the sepals and petals. Several years ago a chartreuse-green colored flower was sent in to the author which had been reportedly collected on Sulawesi Island in the Celebes. The sepals and petals also have broad transverse cinnamon to brownish-red bars, although the bars may be much narrower on the inner halves of the lateral sepals. The midlobe of the lip may have two, sometimes one, magenta stripes on both sides of the median keel.

This species may be confused superficially with *Phalaenopsis sumatrana.* In fact, it was suggested in Sander's One-Table List of Orchid Hybrids 2:854, 1961, that *P. amboinensis* is merely a variety of *P. sumatrana,* which of course is incorrect.

However, an examination of these two species shows that each can readily be distinguished, especially in the details of the lips and the shape of the columns. *Phalaenopsis sumatrana* of the section *Zebrinae* is characterized by an extended hooded or cucullate clinandrium with an erose-denticulate margin and a densely hirsute midlobe of the lip. *Phalaenopsis amboinensis* is noted for the absence of a hooded clinandrium, for the glabrous midlobe of the lip, and for a double serrated edge on the median keel on the midlobe of the lip.

Phalaenopsis amboinensis was first described by J. J. Smith in 1911 from the island of Ambon, variously spelled Amboina, Amboyna, Apon, in the Molucca Archipelago, formerly the Dutch East Indies, from a collection by Lach de Bère which was cultivated in the Botanical Garden at Bogor, Indonesia (Java). In 1912, Finet published a species collected by Hombron, also on Ambon, and described under the name of *Phalaenopsis Hombronii.* This latter specimen, collected during the voyage of the Astrolabe between 1838 and 1840, is in the Herbarium of the Natural History Museum, Paris, France, and upon examination, I have found it to be in no way separable from *P. amboinensis. Phalaenopsis amboinensis* has also been reported from Seram and recently from Sulawesi Island (Celebes).

Phalaenopsis psilantha was included previously under *P. modesta* as a synonym. Since the first publication of my revision a copy of Schlechter's original drawing of the type was located. A careful study of this drawing convinces me that it is identical with *P. amboinensis.* Both *P. amboinensis* and *P. psilantha* were described in the same year only a few months apart.

PRIMARY CROSSES

Phalaenopsis amboinensis J. J. Smith

× *P. amabilis* = *P.* × *Deventerana.* 1927 (van Deventer)

× *P. cochlearis* = *P.* × *Amblearis.* 1972 (Wallbrunn)

× *P. cornu-cervi* = *P.* × Corona. 1973 (Shaffer's Tropical Gardens)

× *P. equestris* = *P.* × *Ambotris.* 1970 (Thornton)

A copy of watercolor of *P. Kunstleri* at Kew.

Phalaenopsis Kunstleri.

Phalaenopsis amboinensis.

Phalaenopsis cochlearis.

Phalaenopsis viridis.

Phalaenopsis amboinensis 'Golden Treasure'.

× *P. fasciata* = *P.* × Golden Pride. 1975 (Dobkin)
× *P. fimbriata* = *P.* × Elaine-Liem. 1972 (Kolopaking)
× *P. gigantea* = *P.* × David Lim. 1974 (David Lim: Alsagoff)
× *P. Lindenii* = *P.* × Wanda Williams. 1967 (Wallbrunn)
× *P. Lueddemanniana* = *P.* × *Ambomanniana.* 1965 (Thornton)
× *P. maculata* = *P.* × Good Cheer. 1973 (Hager)
× *P. Mannii* = *P.* × Mambo. 1965 (Thornton)
× *P. Mariae* = *P.* × Macassar. 1962 (Kirsch)
× *P. pantherina* = *P.* × Doris Blomquist. 1975 (Kolopaking)
× *P. Sanderana* = *P.* × Doc Charles. 1961 (Miller)
× *P. Schillerana* = *P.* × *Schillambo.* 1968 (Thornton)
× *P. Stuartiana* = *P.* × Alice Millard. 1969 (Fort Caroline Orchids: Wallbrunn)
× *P. sumatrana* = *P.* × *Ambotrana.* 1965 (Thornton)
× *P. violacea* = *P.* × Princess Kaiulani. 1961 (Kirsch)

× *Doritis pulcherrima* = × *Doritaenopsis* Jim Chan. 1973 (Fort Caroline Orchids: Wallbrunn)

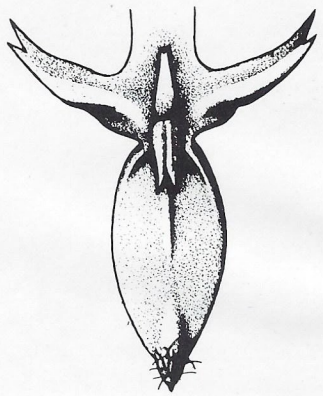
Phalaenopsis javanica J. J. Smith in Bull. Jard. Bot. Buitenz. ser. 2, no. 26:77, 1918; Sweet in Amer. Orch. Soc. Bull. 38:329, 1969.

Lectotype: Indonesia (Java). Priangan, on south coast between Garoet and Wijnkoops-Bai. Cult. by J. Schuller tot Peursum s.n.! (L).

Syn.: *Phalaenopsis latisepala* Rolfe in Kew Bull. 130, 1920.

Type: Cult. Liouville s.n.! (K).

Epiphytic, decumbent; roots fleshy, flexuous, glabrous; stem short, completely enclosed by approximate, conduplicate leaf bases; leaves shining, fleshy, leathery, from a cuneate base obovate or oblong-elliptic or elliptic, acute or obtuse, up to 22 cm. long, up to 10 cm. wide; inflorescence suberect, somewhat arcuate, simple, occasionally branched, up to 25 cm. long, commonly much shorter, with a prominently fractiflex rachis; bracts triangular-cucullate, acute or subacuminate, 4-5 mm. long, much shorter than pedicellate ovaries; flowers fleshy, spreading, all open simultaneously, 3 cm. across; dorsal sepal elliptic to subrotund, obtuse, mucronate at apex, 10-17 mm. long, 7-10 mm. wide; lateral sepals similar to dorsal sepal, oblique, distinctly mucronate at apex, distinctly carinate dorsally along midvein, 10-17 mm. long, 10-22 mm. wide; petals broadly elliptic or suborbicular, subacute or obtuse, 9-14 mm. long, 7-10 mm. wide; lip adnate to column-foot, distinctly clawed, 3-lobed; lateral lobes porrect, oblong-linear, longitudinally sulcate in middle, the anterior part more fleshy than posterior, with an acute bidentate apex; midlobe narrowly obovate-oblong or oblong-elliptic, very fleshy, almost trigonous, indistinctly carinate in middle, slightly incrassate at apex where adorned with a few hairs; disc between lateral lobes provided with a lanceolate, minutely bidentate, lamella-like, retrorse appendage, in front of which at junction of midlobe and lateral lobes there is a linear, bidentate, longitudinally sulcate, fleshy callus; length of whole lip 11-18 mm.; width across lateral lobes 10-14 mm.; column fleshy, subcylindric, somewhat arcuate, up to 6 mm. long; pedicellate ovary up to 2 cm. long.



Lip of *P. javanica.* Drawn from type.

Distribution: Indonesia (Java).

INDONESIA. Priangan, between Garoet and Wijnkoops-Bai. Cult. Hort. Bogor and by Schuller tot Peursum s.n.! (BO,L); near Tjibeber. Coll. Winckel 138 (BO); without locality. Coll. Ploem s.n.! (BO,L). Cult. Liouville, Maure, Ille-et-Villaine, France, s.n.! (K). Origin and collector unknown. Cult. Hort. Bogor. s.n.! (AMES,L,P).

Illustration: Bull. Jard. Bot. Buitenz. ser. 3, 6: t. 12, fig. 1, 1924.

Observations: The following color description is given by J. J. Smith. The sepals and petals vary from white to greenish yellow or yellow, marked with longitudinal stripes consisting of numerous small brownish purple spots giving the whole a tessellate appearance. The lateral lobes of the lip are yellowish in front with a pale suffusion at base and with a white disc. The midlobe of the lip is purple or lilac in front and white at base. The column is white. This species flowered in cultivation for the first time in April, 1914. A plant of unknown origin flowered simultaneously on April 16, 1914, in the Royal Botanic Garden, Glasnevin, Ireland, by Sir F. W. Moore and on April 28, 1914, at Maure de Bretagne, France, by Roger Liouville. Both of these latter collections were sent to Rolfe at the Royal Botanic Garden, Kew, England, for determination. At that time a colored illustration was prepared from one of the living plants which is reproduced here through the permission of the director of the Royal Botanic Garden, Kew, England. These specimens were described by Rolfe as *Phalaenopsis latisepala.* However, an examination of the type material leaves no doubt that it is identical with *P. javanica. Phalaenopsis*

latisepala first flowered in the collection of M. Roger Liouville, of Maure, Ille-et-Villaine, France in April 1914 (Kew Bull. 130, 1920), when it was sent to Kew through F. W. Moore, Glasnevin. The flowers are said to be violet scented, and have greenish yellow sepals and petals with rows of red-brown dots and the white lip has a purple apex.

This species was used in France in a cross with *P. amabilis,* named *P.* × *flava* Guillaumin. A colored illustration of this unique cross appears in Archives du Muséum Nationad d'Histoire Naturelle, ser. 6, 4: t. 1, fig. 8, 1929. It should be noted that the linear arrangement of the spots on the sepals and petals as well as the magenta or purple color of the lip manifest themselves as dominant characters in the progeny.

Phalaenopsis javanica was rediscovered around 1975.

PRIMARY CROSSES

Phalaenopsis javanica J. J. Smith

× *P. amabilis* = *P.* × *flava* Guillaumin. 1929

× *P. fimbriata* = *P.* × Agus Ligo. 1979 (Kolopaking)

Phalaenopsis Micholitzii Rolfe in Gard. Chron. ser. 3, 8:197, 1890 (*nomen*); Kew Bull. 130, 1920; Sweet in Amer. Orch. Soc. Bull. 38:331, 1969.

Type: Philippine Islands. Mindanao. Coll. Micholitz s.n.! (AMES).

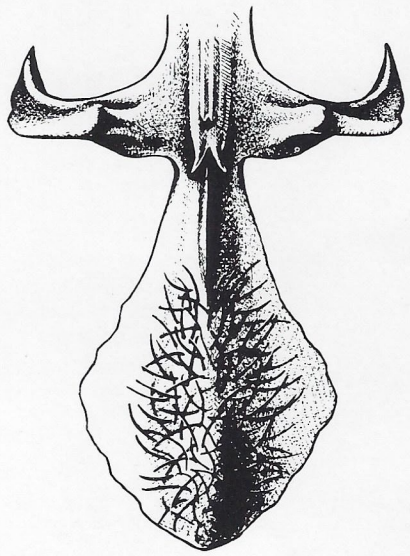
Epiphytic; roots copious, flexuous, glabrous; stem very short, completely enclosed by imbricating conduplicate leaf bases; leaves fleshy, arching, pendulous in natural position, from a cuneate base obovate, acute or obtuse, up to 16 cm. long, up to 6 cm. wide; inflorescences one to several, lateral, very short, suberect, arching, including the short somewhat fractiflex rachis up to 5 cm. long; bracts distichous, cucullate-ovate, acute or subacuminate, up to 5 mm. long; flowers rather delicate, apparently produced in succession; sepals and petals spreading; dorsal sepal elliptic or ovate-elliptic, acute at canaliculate apex, up to 33 mm. long, up to 16 mm. wide; lateral sepals obliquely ovate, acute or subacuminate at canaliculate apex, up to 33 mm. long, up to 17 mm. wide; petals from a cuneate base abruptly ovate-elliptic, obtuse or subacute, up to 28 mm. long, up to 17 mm. wide; lip fleshy, 3-lobed, lateral lobes from a triangular base falcate, with prominent callosities in middle; midlobe from a cuneate base subrhombic or ovate-rhombic, obtuse in front, coarsely crenulate along margin, somewhat swollen at apex, the swelling tapering into a distinct keel toward base, the center of midlobe covered with long prominent, coarse, straggly hairs; disc between lateral lobes provided with a double superimposed, cylindric, fleshy, bifurcate callus; the upper callus bidentate in front and embedded in its entire length in the anterior callus; length of whole lip up to 22 mm., width across lateral lobes up to 16 mm.; column fleshy, cylindric, somewhat dilated towards base, 12 mm. long; pedicellate ovary up to 3 cm. long.

Distribution: Philippine Islands. Mindanao.

PHILIPPINES. Coll. Micholitz s.n.! (AMES,BM,K,W); Cult. Sander s.n.! (K); Cult. Imschoot s.n.! (K). Also living cultivated flowers have been studied.

Illustrations: Phil. Jour. Sci. 52: t. 2, figs. 1, 2, t. 5, figs. 25-33, 1933; *ibid.* 77: t. 1, fig. 8, t. 4, figs. 19-26, 1947; Phil. Orch. Rev. 3, no. 3:24, 1950; Orch. Dig. 35:46, 1971.

Observations: The flowers are from white to creamy white to greenish white, with an orange-yellow callus on the lateral lobes of the lip.



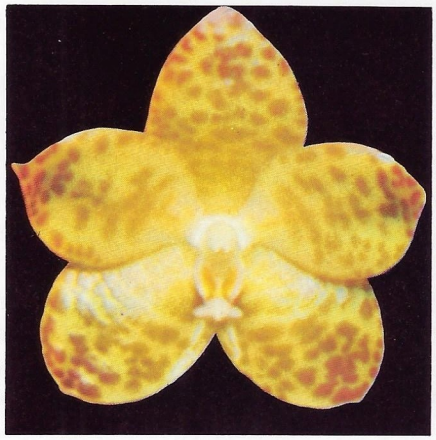
Lip of *P. Micholitzii*. Drawn from type.

This species was first introduced in 1889 by Sander from Mindanao. Due to a set of unusual circumstances, several years passed before a scientific description of this species appeared in the literature. Originally Micholitz had prepared a sketch of the plant in the field and sent it together with dried flowers to Reichenbach for identification, but because of Reichenbach's death, and the terms of his will which required that his herbarium be sealed for twenty-five years, it remain undescribed. Originally it was mentioned in 1890, in the Gardeners' Chronicle with a general comment on the color of the flowers and the size of the leaves. Although this species was mentioned repeatedly in various journals and periodicals, it was not until 1920, when Rolfe published for the first time an official description based on Sander's importation from Micholitz. At that time Rolfe stated that its native habitat was "Malaya, without precise locality," but there seems to be no doubt about its origin being the island of Mindanao. This fact is confirmed by specimens now in the Orchid Herbarium of Oakes Ames which were received in September 1889, with the notation that they were collected by W. Micholitz on Mindanao. Consequently Rolfe's statement about the origin is erroneous.

This species has been collected only a few times and,

A copy of original watercolor of *P. latisepala,* synonym of *P. javanica.*

Phalaenopsis gigantea.



Phalaenopsis gigantea 'flava'.

Phalaenopsis javanica.

Phalaenopsis Micholitzii

Phalaenopsis speciosa var. *Imperatrix*
(Orchid Album, Vol. VI, t. 158, 1885).

A copy of original watercolor of *P. speciosa* by Reichenbach.

Phalaenopsis speciosa var. *tetraspis*
(Bot. Mag., Vol. 119, t. 7321, 1893).

hence, is exceedingly rare in cultivation. However, it is in cultivation today in the United States, refound by John Miller in the Philippines.

PRIMARY CROSSES

Phalaenopsis Micholitzii Rolfe

× *P. fimbriata* = *P.* × Green Valley. 1972 (Thornton)
× *P. Mannii* = *P.* × Margie Lane. 1970 (Thornton)
× *P. Stuartiana* = *P.* × Micholart. 1970 (Wallbrunn)
× *P. sumatrana* = *P.* × Sumitz. 1973 (Wallbrunn)

Phalaenopsis gigantea J. J. Smith in Bull. Dept. Agri. Ind. Néerl. 22:45, 1909; Sweet in Amer. Orch. Soc. Bull. 38:328, 1969.

Type: Borneo. Without precise locality. Collected during Expedition Nieuwenhuis, 1896-1897 by Mantri Jaheri s.n.! (BO).

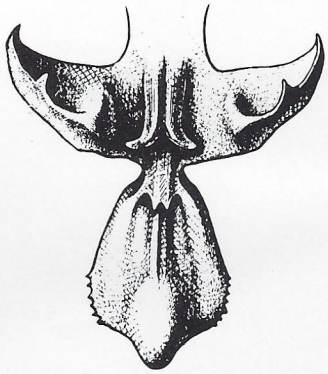
Epiphytic; roots abundant, rather fleshy, glabrous; stem very short, rather heavy in appearance, completely enclosed by approximate conduplicate bases of leaves; leaves 5-6, very large, pendulous, rather leathery, shiny on both sides, oblong-ovate to elliptic, obtuse, up to 50 cm. long, up to 20 cm. wide; inflorescence from axil of leaves, lateral pendulous, densely many-flowered raceme, up to 40 cm. long; bracts triangular, acute, concave, 5-6 mm. long; flowers fleshy, all open simultaneously, slightly aromatic, more or less 5 cm. across; dorsal sepal spreading, elliptic or ovate-elliptic, obtuse, up to 31 mm. long, up to 21 mm. wide; lateral sepals fleshy, spreading, obliquely elliptic or ovate-elliptic, obtuse, base adnate to column-foot, up to 31 mm. long, up to 21 mm. wide; petals elliptic or rhombic-elliptic, acute or obtuse, up to 27 mm. long, up to 20 mm. wide; lip 3-lobed, rather small, fleshy; lateral lobes triangular-subfalcate, with cushion-like callus toward center; midlobe ovate or ovate-subrhombic in outline, with few teeth on lateral margins and with an ovoid callus at apex, at junction with lateral lobes adorned with a fleshy, bidentate, plate-like callus in front of which there is a thin keel in center; disc between lateral lobes provided with a fleshy subcylindric callus, the apex of which bifurcates in a falcate manner; length of whole lip 15 mm., width across lateral lobes 15 mm.; column short, fleshy, cylindric, dilated toward column-foot, up to 11 mm. long; pedicellate ovary 25 mm. long.

Distribution: Borneo, Sabah (Merutai and Tiger Mt., No. Borneo).

BORNEO. Without precise locality. Coll. Jaheri s.n.! (BO, L); Cult. Hort. Bogor s.n.! (AMES,L,P). Also many cultivated living flowers have been studied.

Illustrations: Bull. Jard. Bot. Buitenz. ser. 3, suppl. 3: t. 120, fig. 1, 1938; Malay. Orch. Rev. 7 (no. 4): t. opposite page 16, 1964; Orch. Dig. 36:86, 1972; Katoh & Kutakuchi, Orchids in Colour, pl. 114, fig. 11, 1974.

Observations: In recent years there has been considerable interest in *Phalaenopsis gigantea.* Plants of it were first collected in 1897, when a plant collector by the name of Mantri Jaheri, in the employ of Dr. A. W. Nieuwenhuis at the Royal Botanic Gardens in Buitenzorg, Indonesia (Java), was on a collecting trip in Borneo, probably West or Central Borneo. He found an exceptionally large specimen of a *Phalaenopsis* somewhere in the Lung-Karang mountains on the right bank of the Tjehan river, a tributary of the Sungei Mahakam. He believed that the plants were that of *P. amabilis.* Most collectors probably would not have bothered to take the specimens. Nevertheless, the plants eventually arrived at Buitenzorg and from the beginning proved to be an exceedingly slow grower. Finally, the one surviving plant produced a long pendent inflorescence. Unmistakably the flowers were those of a *Phalaenopsis,* but distinctly not of *P. amabilis.* Jacob J. Smith, then curator of the Gardens at Buitenzorg, described it under the name of *Phalaenopsis gigantea* in 1909, in Bulletin de



Lip of *P. gigantea.* Drawn from type.

l'Agriculture aux des Indes Neerlandaises 22:45. Sometime after it was described, the plant died. However, before it succumbed, it was used for the first time as the pollen parent of a cross, *P.* x *bogoriensis* J. J. Smith, a hybrid between *P. amabilis* and *P. gigantea.* The seeds were germinated in the Botanic Gardens at Bogor. The seedlings flowered and were described and illustrated in De Orchidee 5:71, 1936 for the first time.

Nothing more was known of this species until about forty years later in 1937, when a new rubber estate was opened up in a part of East Borneo far from where it was originally collected. It was there in the primeval forests that large quantities were rediscovered and collected, and offered for sale. Some of the plants according to the report had leaves up to 90 cm. long (3 feet) and 40 cm. wide (16 inches). In 1940, it was also reported that in Java such a large quantity of plants were received, that peddlers were selling them from house to house at quite a reasonable price (F 1.50 each).

Recently (Orch. Dig. 43:28, 1979) it was reported from Sabah (North Borneo). Today it is not uncommon in cultivation in this country. Each plant when well grown has sev-

eral pendent, large, very fleshy, dark green leaves, commonly up to 18 inches or more in length and 8 inches or more in width. The yellow-green inflorescence up to 15 inches or more in length is from the axil of a lower leaf and may have one or two branches with usually a total of up to 20 to 30 flowers rather closely congested on the inflorescence. There is one record of a spike with two short branches having a total of 97 flowers. Mr. Moir in the Bulletin of the Pacific Orchid Society 29:13, 1971, reported flowering a specimen with three racemes having a total of 70 flowers. The buds usually open all at once on the raceme. The color and markings on the flowers are quite variable. The sweetly scented flowers, varying from 1¾ to 2 inches across, although occasionally they may be up to 2½ to 2¾ inches across, are of very heavy substance, almost coriaceous, and vary in color from an off-white to cream-color to yellow or light greenish-yellow which fades into white at the base of the sepals and petals. The sepals and petals are covered, occasionally rather densely, with red-brown, maroon, purple or violet-brown blotches and bars, often concentrically arranged. The lip is white, often with three rather bright magenta or carmine lines or stripes on each side of the median keel on the midlobe. There is a cushion-like callus at the apex of the midlobe, the margins of which may be denticulate. The lateral lobes have orange calli and the apical half of each is orange-yellow dotted with magenta. The junction of the lateral and midlobes may be magenta in color. On the disc between the lateral lobes is an orange, rather cylindric, fleshy callus, the apex of which bifurcates in a falcate manner. The column is white, short, fleshy and dilated toward the column-foot. There should be no problem in identifying the flowers of plants of this species.

Four plants have been awarded by the judges of the *American Orchid Society: Phalaenopsis gigantea* 'Gretchen Wallbrunn,' C.B.M. in 1963, *P. gigantea* 'The General,' A.M. in 1966, *P. gigantea* 'Flying Partridge,' A.M. in 1967 and *P. gigantea* 'Sparks,' H.C.C. in 1968. The judges of the Fifth World Orchid Conference at Long Beach, California in 1966 awarded a Silver Medal to *P. gigantea* 'Orchidglade.' Then, in 1968 the Orchid Committee of the Royal Horticultural Society, London, England granted an Award of Merit to *P. gigantea* 'Fincham.'

The first hybrid in which *P. gigantea* was used as the pollen parent was *P.* x *bogoriensis* J. J. Smith. The pod parent was *P. amabilis.* The cross was made and raised in the botanic gardens at Bogor (Buitenzorg), Indonesia (Java). It was described and illustrated in De Orchidee 5:71, 1936, for the first time as follows: "This flower has a white background and all the sepals and petals are finely spotted with rose-purple. The lip is three-lobed; the side-lobes fleshy, having a ridge in the middle, are also neatly speckled with rich dark purple; the midlobe is streaked with rose-purple, suffused with yellow and split at the upturned apex into two very short awl-shaped tendrils. The flower measures 64 mm. vertically and 64 mm. horizontally. . . ."

A photograph of this hybrid was reproduced in De Orchidee 9:2, 1940.

To date other crosses involving *P. gigantea* have been registered. One with *P. Stuartiana* in 1969, is named *P.* Gretchen. Two clones of this cross, 'Joe Kotewicz' and 'Kanapaha,' were each awarded a Highly Commended Certificate by the judges of the American Orchid Society. The flowers of these clones are described as having a white background with a yellow flush or a green overlay, finely dotted with lavender dots. The flowers have a natural spread of 2 inches and 2-3/16 inches.

PRIMARY CROSSES

Phalaenopsis gigantea J. J. Smith

× *P. amabilis* = *P.* × *bogoriensis* J. J. Smith. 1936
× *P. amboinensis* = *P.* ×David Lim. 1974
(David Lim: Alsagoff)
× *P. equestris* = *P.* × Bernice Maskin. 1978
(Wallbrunn)
× *P. fasciata* = *P.* × Reichentea. 1975 (W. W. G. Moir)
× *P. Lueddemanniana* = *P.* × Joey. 1973
(Fort Caroline Orchids: Wallbrunn)
× *P. Mannii* = *P.* × Rosie Clouse. 1971
(Fort Caroline Orchids: Wallbrunn)
× *P. Stuartiana* = *P.* × Gretchen. 1969 (Wallbrunn)
× *P. sumatrana* = *P.* × David Ai. 1977 (Dobkin)
× *P. violacea* = *P.* × Mok Choi Yew. 1968 (C. Y. Mok)

× *Doritis pulcherrima* = × *Doritaenopsis* Tan Swee Eng. 1973 (Teoh Eng Soon)

Phalaenopsis Robinsonii J. J. Smith in Phil. Jour. Sci. 12:259, 1917; Sweet in Amer. Orch. Soc. Bull. 38:332, 1969.

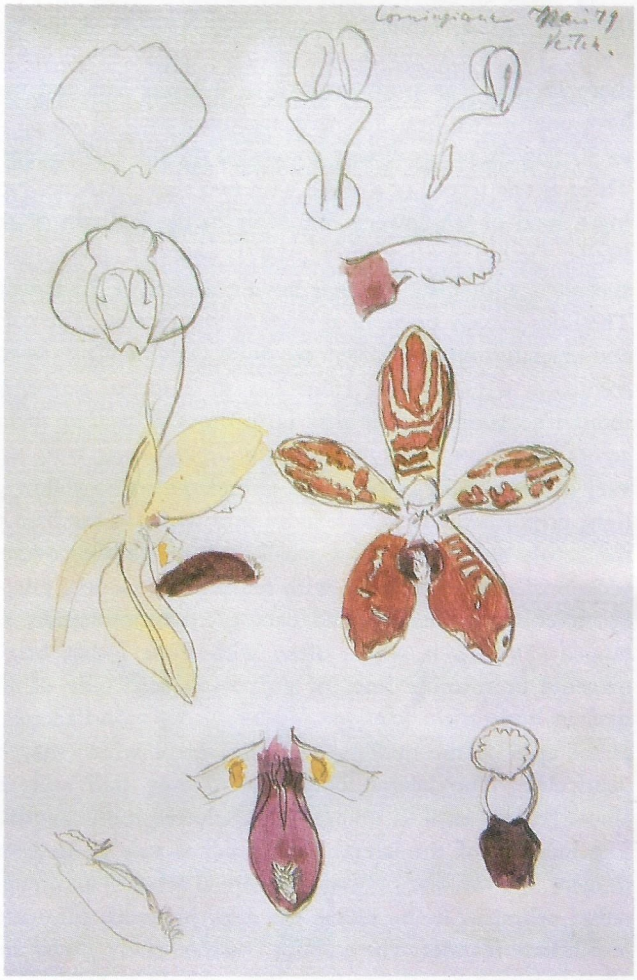
Type: Ambon., Hitoe Messen. Coll. Robinson 1627! (L).

Epiphytic; roots numerous, fleshy, flexuous, glabrous; stem short, 4-5 leaved, completely enclosed by large imbricating sheath-like leaf bases; leaves articulate, fleshy, pendulous, oblong-oblanceolate, acute or subobtuse, tapering to a conduplicate base, up to 31 cm. long, up to 5.7 cm. wide; inflorescence suberect, arcuate, simple or occasionally branched, few-flowered raceme, including fractiflex rachis up to 20 cm. long; bracts cucullate-ovate, acute, distichous, 5 mm. long; flowers fleshy, produced in succession; dorsal sepal narrowly oblong-ovate or elliptic, with a canaliculate, acute apex, 15 mm. long, 6 mm. wide; lateral sepals obliquely lanceolate or narrowly elliptic, apex canaliculate-subfalcate, subacuminate, 17 mm. long, 5 mm. wide; petals somewhat oblique, elliptic or subrhombic, acute, 14 mm. long, 6 mm. wide; lip very fleshy, short-clawed, 3-lobed; each lateral lobe triangular, subfalcate, acute, above the anterior margin provided with a small subglobose callus; midlobe

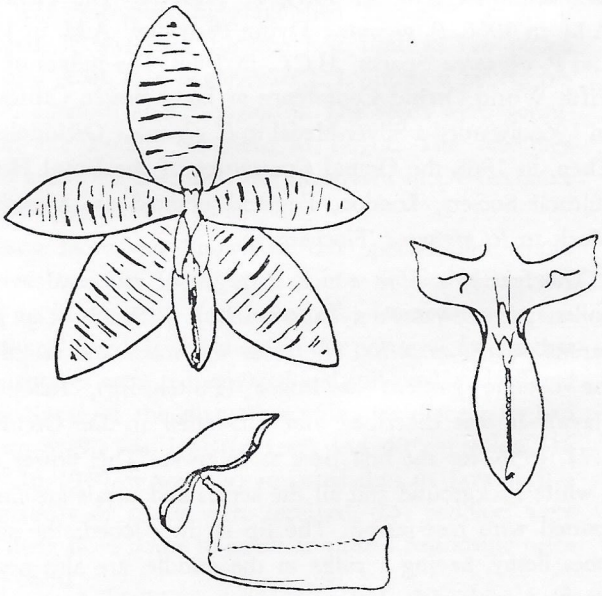
Phalaenopsis Corningiana.

Phalaenopsis Corningiana.

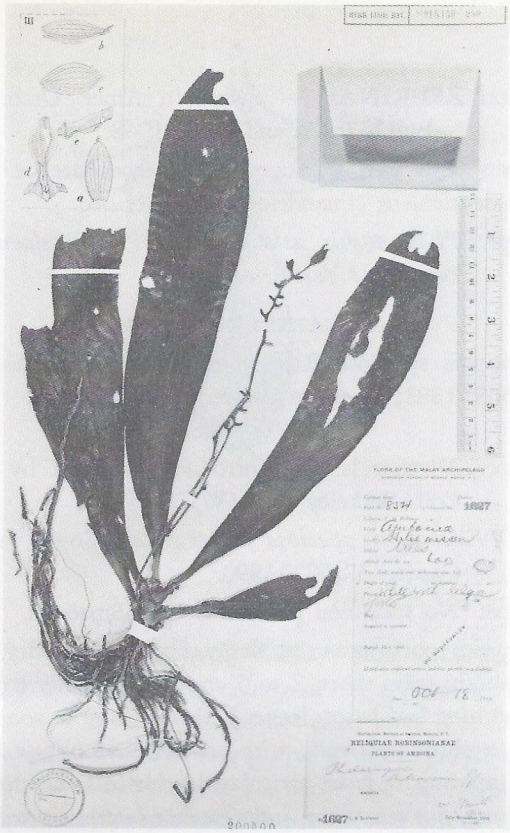
Phalaenopsis Corningiana.



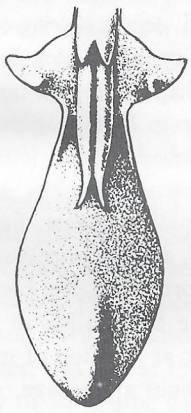
Copy of Reichenbach's original watercolor of *P. Corningiana.* Type.



Copy of the original unpublished pencil sketch by Schlechter of *P. psilantha.*



Holotype of *P. Robinsonii* at Leiden.



Lip of *P. Robinsonii.* Drawn from type.

from a cuneate base ovate, very fleshy, smooth at apex provided with an ovoid, cushion-like callus; disc between lateral lobes proceeding from the claw provided with a semicylindric bidentate callus, in front of which there is an additional cylindric bifurcate callus, grooved in middle and projecting almost halfway into the disc of the midlobe; no median keel on midlobe; length of whole lip up to 12 mm., width across lateral lobes 6 mm.; column erect, cylindric, fleshy, 1 cm. long; pedicellate ovary 1 cm. long.

Distribution: Ambon. Only the type collection has been seen.

Illustration: Bull. Jard. Bot. Buitenz. ser. 3, suppl. 3, t. 120, fig. 3, 1938.

Observations: The flowers are reported to be white with lilac spots. J. J. Smith compares this species with *P. amboinensis* and *P. Hombronii,* since both of these have a smooth, hairless lip. However, an examination of the type specimen of *P. Hombronii* has shown it to be identical with *P. amboinensis.*

It is possible that this species ultimately will be referable to another section of this genus because the description of the floral segments is based on an immature bud. If the mature flowers have the expected broad floral segments of the section *Amboinenses,* then its assignment is correct. The fact that this species is accommodated in this section is based primarily on J. J. Smith's decision in comparing it with the type of this section, i.e., *P. amboinensis.*

So far as I know, this species has not been collected since the type was found in 1913.

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Section **ZEBRINAE** Pfitzer in Engl. & Prantl, Pflanzenfam. 2, pt. 6:212, 1889; Sweet in Amer. Orch. Soc. Bull. 37:1090, 1968.

Syn.: Sect. *Zebrinorchis* O. Ktze. in Post & Ktze., Lex. Gen. Phan. 430, 1904.

Flowers stellate, petals narrowly obovate or oblanceolate, i.e., length more than twice the width.

KEY TO THE SPECIES

1. Column with well-developed, either cucullate, high, erose or denticulate, clinandrium or anther bed. (Subsection **Zebrinae**) 2
1a. Column with a non-developed, low, marginate entire clinandrium or anther bed 4
2. Clinandrium cucullate or hood-shaped 3
2a. Clinandrium flabellate or flared-out..... **P. speciosa**
3. Lip between lateral lobes with digitate, muricate, papillose or lamellate callosities; at junction of midlobe and lateral lobes of lip with a fleshy bifurcate callus; sepals and petals with transverse colored bars or blotches ..... **P. sumatrana**
3a. Lip between lateral lobes with a single excavate callus, confluent with bifurcate fleshy callus at the junction of midlobes and lateral lobes; dorsal sepal and petals with longitudinal or vertical stripes or bars ..... **P. Corningiana**
4. Lip between lateral lobes with various adornments other than single bifid callus. (Subsection **Lueddemannianae**) 5
4a. Lip between lateral lobes with a single bifid callus....11
5. Flowers deep magenta-purple; lip with flabellate or flabellate-ovate midlobe, sparsely muricate above, thickened in front and with few coarse hairs between the keel and apical thickening; callosity between lateral lobes of lip plate-like with denticulate edges ..... **P. pulchra**
5a. Flowers with variously colored, often with transverse bars on sepals and petals 6

6. Callosities between lateral lobes of lip retrorse or directed toward base 7

6a. Callosities between lateral lobes of lip antrorse or directed toward tip 8

7. Midlobe of lip trulliform or trowel-shaped with a hairy callus occupying the central area from central keel to apex ..... **P. Reichenbachiana**

7a. Midlobe of lip oblong-ovate with a few stiff hairs on midline from central keel to apex..... **P. fasciata**

8. Margins of midlobe of lip upcurved, prominently dentate-fimbriate ..... **P. fimbriata**

8a. Margins of midlobe of lip decurved, entire or obscurely erose-dentate in front only 9

9. Callus between lateral lobes of lip broadly triangular, cushion-like covered with short papillae terminating in two superimposed, truncate plates; sepals and petals without a hieroglyphic pattern..... 10

9a. Callus between lateral lobes of lip semicylindric, glabrous, terminating in numerous elongate, acicular digits; sepals and petals with a hieroglyphic pattern ..... **P. hieroglyphica**

10. Midlobe of lip oblong-ovate with a well-developed hairy callus toward apex; sepals and petals distinctly barred ..... **P. Lueddemanniana**

10a. Midlobe of lip ovate with a well-developed glabrous callus toward apex; sepals and petals marked otherwise ..... **P. violacea**

11. Midlobe of lip hairy at apex. (Subsection **Hirsutae**) 12

11a. Midlobe of lip glabrous at tip. (Subsection **Glabrae**) 13

12. Inflorescence erect or arching; sepals obovate, acute, acuminate with fine, colored, short, transverse lines or bars; midlobe of lip with glabrous apical callus; disc between callus and central keel sparsely hirsute ..... **P. pallens**

12a. Inflorescence pendent; sepals obovate or elliptic-obtuse with large irregular colored blotches; midlobe of lip from central keel to apex including callus prominently hairy ..... **P. Mariae**

13. Sepals and petals with narrow transverse bars or lines on basal halves; midlobe of lip with a central lamellate keel at basal end; lateral lobes of lip triangular ..... **P. modesta**

13a. Sepals and petals covered with large blotches throughout; midlobe of lip with shallow parallel grooves and without lamellate keel; lateral lobes of lip quadrate ..... **P. maculata**

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Subsection **ZEBRINAE** — Sweet in Amer. Orch. Soc. Bull. 37:874 and 1091, 1968.

Column with well-developed, either cucullate or high, erose or denticulate, clinandrium or anther bed.

Type: *Phalaenopsis zebrina* Witte = *Phalaenopsis sumatrana* Korth. & Rchb.f.

ENUMERATION OF SPECIES

Phalaenopsis speciosa Rchb.f. in Gard. Chron. n.s. 15: 562, 1881; Sweet in Amer. Orch. Soc. Bull. 37:1091, 1968.

Type: Nicobar Islands. Introduced in 1881 by Low. Coll. Berkeley s.n.! (W).

Syn.: *Phalaenopsis speciosa* var. *maculata* Gower in The Garden 37:582, 1890.

Type: No specimen preserved. Cult. Smee s.n.

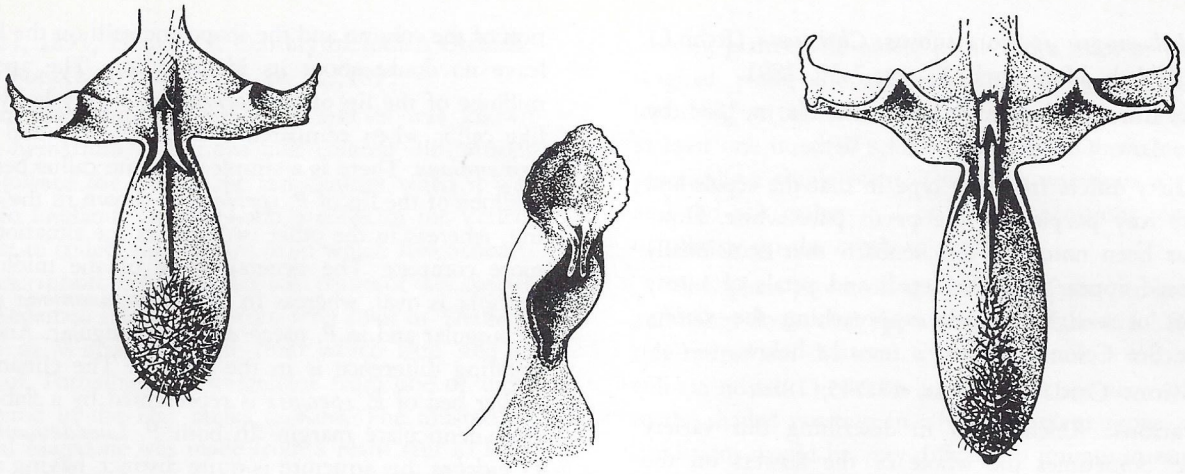
Epiphytic; roots numerous, fleshy, fibrous when dry, flexuous, smooth; stem short, 2 to 5 cm. long, densely covered with sheathing leaf bases; leaves fleshy, arching or recurved, elliptic to elliptic-obovate, with an acute or obtuse apex, slightly tapering to base, articulated with leaf sheaths, 15-20 cm. long, 6-8 cm. wide; inflorescence lateral from lower leaf sheaths, arching or pendent, racemose or paniculate, loosely many-flowered, up to 30 cm. long; bracts small, triangular, acuminate, cucullate, 5-7 mm. long; flowers fleshy, stellate, variously colored; sepals oblong-elliptic to obovate-elliptic, acute or obtuse, up to 28 mm. long, up to 12 mm. wide; petals similar in shape to sepals, but somewhat shorter, up to 28 mm. long, up to 10 mm. wide; lip short-clawed, from a cuneate base 3-lobed; lateral lobes triangular with truncate, erose-dentate, semifalcate tip, and with cushion-like callus in middle; midlobe ovate, fleshy, convex, with high, serrate central keel, at apex with a cushion-like callus, densely covered with short hairs; disc between lateral lobes commonly with a simple bifid callus, at times with a few additional protuberances; at junction of midlobe and lateral lobes with a long bicirrhous appendage, whole lip 18 mm. long, 16 mm. across lateral lobes; column fleshy, erect, to 8 mm. long; clinandrium well-developed, flabellate with an erose-denticulate margin; pedicellate ovary cylindric, 2-3 cm. long.

Distribution: Nicobar Islands: Katchal Island, Teressa Island, and others.

NICOBAR ISLANDS. Coll. Berkeley s.n.! (W); Cult. Wigan s.n.! (K); Cult. Sander s.n.! (K).

Illustrations: Gard. Chron. n.s. 18:745, 1882.

Observations: This is an exceedingly variable species regarding the color of the flowers. The original type was described by Reichenbach as follows: "sepals and petals whitish-rose outside with rows of purple blotches, purple inside, with a few white bars at the base of the petals. Side laciniae of lip yellow, white at the top and base; middle lacinia white with much purple, or nearly purple, and with a tuft of hairs at apex."



Left: Lip of *P. speciosa.* Center: Column of *P. speciosa* and its varieties.
Right: Lip of *P. speciosa* var. *tetraspis.* All drawn from types.

E. S. Berkeley wrote to William Bull on February 28, 1881, from Port Blair, Andamans, "It appears to be a remarkable plant no two plants flowering alike. The first plant that flowered was dark rosy purple with the purple showing through in maculations at the back. The second plant had the sepals rosy purple and the petals ivory white, the third plant had the sepals rosy purple and petals barred with purple and white, other plants coming into flower show other variegations, the back of the flower has sometimes purple maculations agreeing with the shape of the cellular tissue and sometimes a few spots. It is sweet scented enough in the middle of the day to scent the whole orchid house and at night it appears to lose its smell." (Letter in Herb. Reichenbach.)

In publication Berkeley offers a series of additional observations. "In your last issue (Gard. Chron. n.s. 19:310, 1883) Professor Reichenbach desires me to give some notes on the leaves of this new Phalaenopsis. I have just been into the Orchid-house and have measured the largest leaf of one of the finest varieties; this leaf is 19 inches long and is very pointed. A journey of forty-nine days proved too much for all the large plants of this choice Orchid, and I think some of the leaves of the plants that died were even longer than this. The colour of the leaves is light green.

"This plant (Gard. Chron. ser. 3, 2:74, 1887) . . . has a great advantage over P. tetraspis in being a robust grower. It travels quite as badly as P. tetraspis, not more than two plants in a hundred arriving alive, and those only small plants; but when once it has recovered the journey it grows rapidly, and already we have flowered some fine varieties in England with branching spikes of flowers, so that in a few years we may hope to flower plants with twenty-five flowers, as they are found in Nature. This plant does not grow in Mangrove swamps, it grows on large trees, fully exposed to the air; this will probably account for it being more robust. It can in cultivation stand a great deal more light than P. tetraspis, probably as much as any other Phalaenopsis.

"Phalaenopsis speciosa (Orch. Rev. 1:210, 1893) . . . grows under very different conditions to its ally, as it occurs on exposed trees, and within the influence of the salt breezes from the sea. It is found on the small island of Katchal and Teressa, and several small islands near the Great Nicobar. I quite expected to find it on the large island itself, but failed to do so. Indeed, in the Great Nicobar I failed to find a single Phalaenopsis or any other Orchid of consequence, the Order in the place being represented by plants with miserable flowers, only of interest to the botanist, but which I sent specimens of to Professor Reichenbach. I once measured a flower spike of this Phalaenopsis six feet in length. It is a plant that has grand branching spikes in its native home, and varies much in the colour of the flowers. I have seen plants of it of the deepest purple, and others white with only a few purple streaks in the sepals."

Rolfe (Orch. Rev. 1:79, 1893) comments that in the Clare Lawn Collection of F. Wigan, East Sheen, "P. speciosa and its variety Imperatrix grow and flower vigorously. The latter which has nine leaves, some over a foot long and five to six inches wide, is a splendid form, and has received an Award of Merit from the Royal Horticultural Society."

The variety *maculata* Gower given in synonymy is described: "The sepals and petals are pure white, beautifully spotted with lilac-mauve." This obviously represents the original type.

So far as I know, *Phalaenopsis speciosa* is not in cultivation. A recent communication from the Botanical Survey of India indicates that this species and *P. speciosa* var. *tetraspis* are exceedingly rare in the Andaman and Nicobar Islands.

Among the color forms the following have been accorded varietal status:

Phalaenopsis speciosa var. **Christiana** Rchb.f. in Gard. Chron. n.s. 18:745, 1882; Sweet in Amer. Orch. Soc. Bull. 37:1092, 1968.

Syn.: *Phalaenopsis speciosa* subvar. *Christiana* (Rchb.f.) Veitch, Man. Orch. Pl., pt. 7:39, 1891.

Type: Introduced from Nicobar Islands in 1881 by Low. Coll. Berkeley s.n.! (W).

This variety differs from the type in that the sepals and column are rosy purple and the petals pure white. However, it has been noted by Reichenbach that occasionally flowers would appear with the sepals and petals of a rosy purple, but of a lighter shade, approaching the variety *Imperatrix.* See Colonel Berkeley's remarks below.

Illustration: Gard. Chron. n.s. 18:745, 1882.

Observations: Reichenbach in describing this variety comments, "Sometimes the whole of the flowers on the flower-stem will be the same, but occasionally Nature forgets her pretty fashion, and an odd petal is also rosy-purple. The flowers of this variety are slightly smaller than in the other kinds, but this is made up for by the variety being more free flowering and of exceedingly graceful habit. . . . All the varieties are sweet-scented. . . . This great and very distinct beauty flowered in July last."

Phalaenopsis speciosa var. **Imperatrix** Rchb.f. in Gard. Chron. n.s. 18:745, 1882.

Syn.: *Phalaenopsis speciosa* subvar. *Imperatrix* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:38, 1891.

Phalaenopsis speciosa var. *purpurata* Rchb.f. ex Hook. f., Fl. Brit. Ind. 6:30, 1890. *Sphalm.*

Phalaenopsis Imperati Gower in The Garden 37: 447, 1890. *Sphalm.*

Type: Introduced from Nicobar Islands in 1881 by Low. Coll. Berkeley s.n.! (W).

This variety differs from the type in that the flowers are deep rosy purple in color with no white markings on sepals and petals.

E. S. Berkeley in the same letter quoted in part above makes the following remarks: ". . . I herewith send materials from which I think Professor Reichenbach will be able to say whether it is new or not. . . . I think if it turns out to be new it should be called 'Imperatrix' after the Empress of India, and this is appropriate, as the flower is of bright imperial purple or rather rosy purple."

This color form has been a source of confusion in the United States because of the resemblance to those of *P. pulchra.*

Illustrations: Warner & Williams, Orchid Album 4: t. 158, 1885. (Attention is called to the prominently hairy lip); Lindenia 6: t. 258, 1891; Reichenbachia 2:5, t. 51, 1890.

Observations: Of the botanical varieties, the var. *Imperatrix* Rchb.f., as illustrated in Warner & Williams Orchid Album 4: t. 158, 1885, is the most desirable form colorwise, since the white markings on the sepals and petals are minimal. This species, because of its color and appearance, has been confused with *P. pulchra.* However, an examination of the column and the shape and calli on the lip should leave no doubt about its identification. The apex of the midlobe of the lip of *P. speciosa* has a very hairy cushion-like callus when compared with *P. pulchra* and *P. Lueddemanniana.* There is a simple bifurcate callus between the midlobe of the lip of *P. speciosa,* as shown in the ink drawing; whereas in the other two species the situation is much more complex. The general shape of the midlobe of *P. speciosa* is oval, whereas in *P. Lueddemanniana* it is more rectangular and in *P. pulchra* more triangular. Another outstanding difference is in the column. The clinandrium or anther bed of *P. speciosa* is represented by a flabellate and erose-denticulate margin. In both *P. Lueddemanniana* and *P. pulchra* this structure is quite distinct, having a low and entire margin, as may be seen in the accompanying illustration.

It is evident from the foregoing discussion that the three species in question are amply distinct from one another. The morphology of the lips alone is sufficient for recognition. Moreover, the geographical distribution is an additional support in determining not only the identity, but also the lack of close relationship between *P. speciosa* from the Nicobar Islands and the other two species from the Philippines.

Phalaenopsis speciosa var. **tetraspis** (Rchb.f.) Sweet in Amer. Orch. Soc. Bull. 37:1092, 1968.

Basionym: *Phalaenopsis tetraspis* Rchb.f., Xenia Orchidacea 2:146, 1968.

Type: Erroneously reported from Himalaya. Coll. Lobb s.n.! (W).

Syn.: *Phalaenopsis Barrii* King ex Hook. in Ann. Roy. Bot. Gard. Calcutta 5:38, 1895. *Nomen nudum.*

This variety differs from the type only in that the flowers are either white or white with greenish suffusion, especially toward the tips of the sepals and petals. In examining the type material I failed to notice any distinction by which *P. tetraspis* could be maintained as a distinct species beside *P. speciosa.* The illustration in Botanical Magazine, t. 7321 is a fairly accurate representation of this variety. In the text accompanying the plate Hooker has already noted the great similarity between *P. tetraspis* and *P. speciosa.* The Himalayan locality given by Reichenbach is questionable since there is no reference to this on the type sheet.

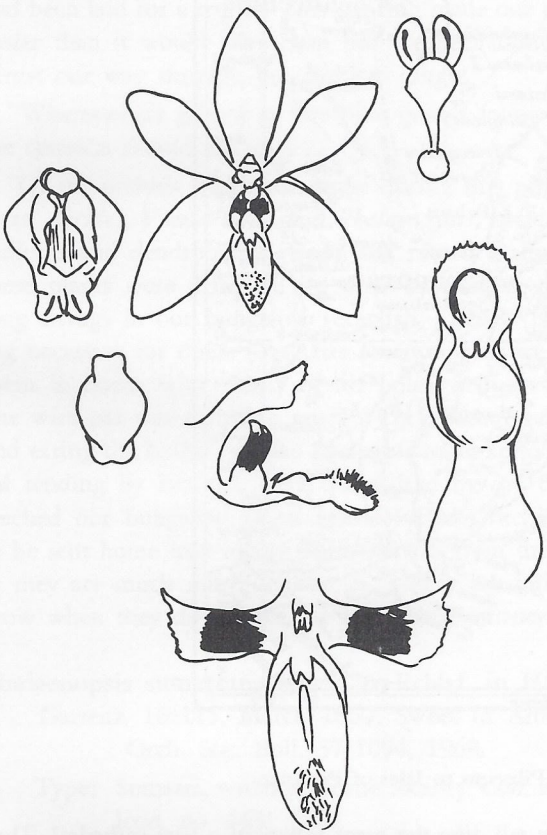
Distribution: Andaman Islands and Nicobar Islands in Andaman Sea.

ANDAMAN ISLANDS. Coll. Lobb s.n.! (W); Coll. Berkeley s.n.! (K,W); Cult. Sander s.n.! (AMES); Cult. Wigan s.n.! (AMES,K); Cult. Bull. s.n.! (W); Cult. Day s.n.! (W). Port Blair. Coll. Foerstermann s.n.! (W). NICOBAR ISLANDS. Great Nicobar. Inland forests, 25 m. Nov. 29, 1975. Coll. P. Chakraborty 3212! (AMES).

Illustrations: Day drawings, May 12, 1881; Bot. Mag.

119: t. 7321, 1893; Hooker, A Century of Indian Orchids: Ann. Roy. Bot. Gard. Calcutta 5: pl. 57, 1895.

Observations: Until recently this species was known only from herbarium collections and colored illustrations published toward the end of the last century when it was cultivated in England. Thomas Lobb, a collector for Veitch, was the first to collect this species from which Reichenbach made his description. E. S. Berkeley sent plants of this species from the Andaman Islands (between west coast of Thailand and India) to William Bull in 1880 which Bull sold to John Day of Tottenham. A watercolor from one of these is to be found in the Day books at Kew. The illustration in Botanical Magazine was made from a plant sent to Kew in 1892 from Port Blair in the Andamans by Horace Man which flowered in May 1893.



Copy of original drawing by Reichenbach of *P. tetraspis,* type of *P. speciosa* var. *tetraspis.*

E. S. Berkeley (Orch. Rev. 1:209-210, 1893), who sent a large quantity of this variety to Bull, writes, "Phalaenopsis tetraspis is a plant especially worth noting. We have not yet in England seen large plants of it, as, unfortunately, the large plants will not travel, and only the small ones reach England alive. But it is a truly beautiful plant in its native home. I myself saw in the South Andaman a plant which was many years old, the main plant bearing enormous leaves, quite three feet long. This plant had a progeny of children growing on the old flower-stems, and these plants again had produced other flower-stems, which were also bearing plants. The whole plant was a mass of bloom, the original plant, the children, and the grandchildren, all blooming at one and the same time. There were certainly at least one hundred spikes in flower at the same time on practically a single plant. This plant was quite a sight, and as I did not gather it, I on several occasions took parties of officers up the creek to see it.

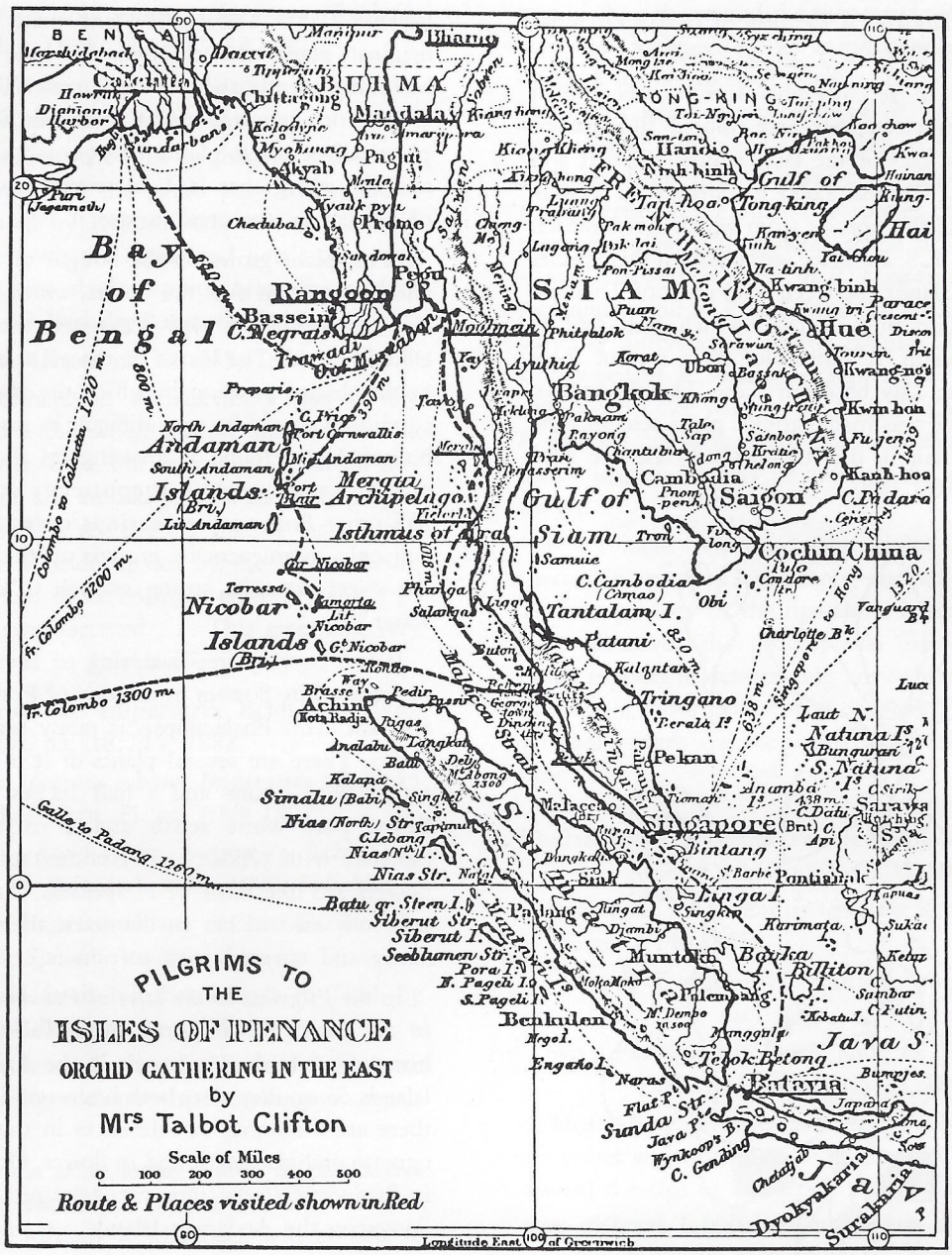
"This plant grows on the boughs of the mangrove trees, and hangs down over the waters, which are tidal. When the tide retires and the mud is exposed, there is a considerable effluvia raised. The leaves of the plant are very soft, owing to the shaded position in which the plant grows, and such conditions would be very difficult to imitate in our English houses. I also found it growing on the rocks at the edge of the swampy ground. It apparently does not like salt air, like other Phalaenopses, as it is never found near the sea, and only commences its growth up the tidal creeks, where the sweet water is strong enough to drive back the sea-water."

It is ". . . very free-flowering . . . bearing a rich panicle of ivory white flowers in the way of P. violacea, delightfully fragrant. This Phalaenopsis is rarely heard of among cultivators. There are several plants of it in flower at Kew . . . each flower is one and a half inches across, with broad, fleshy, pure white sepals and a narrow, hairy labellum blotched with yellow. . . ." Another account says, ". . . the flowers are like those of P. speciosa, but pure waxy white, and fully two inches in diameter, the labellum blunt and fleshy and covered with soft hairs."

In the *Pilgrims to the Isles of Penance, Orchid Gathering in the East,** the authoress, Mrs. Talbot Clifton, describes her and her husband's travels in the Andaman and Nicobar Islands. Since they were both interested in collecting orchids, there are a number of references in this fascinating travelogue to orchids they found in flower. One of special interest is *Phalaenopsis speciosa* var. *tetraspis* which was seen in flower on the Andaman Islands.

Their trip started from England and went through the Suez Canal to Calcutta, Rangoon and the Andaman and Nicobar Islands. They boarded the Asiatic Steamship *Maharajah* on March 15, 1909 for the trip to the Andaman Islands, a convict colony, which lie three hundred and fifty knots west of Rangoon. It was on these islands to which the worst criminals of India and Burma with life sentences were exiled. Hence, most of the fellow passengers were convicts en route to a long term of imprisonment. The islands were first sighted on the 16th of March and on the next morning the convicts were landed on the main Andaman Island, the chief port of which is Aberdeen. Later, a launch took the Cliftons to Port Blair, the capital of Ross Island, a small island with a circumference of about 5 miles. For anyone interested in the history and life on these islands

*Clifton, Mrs. Talbot, PILGRIMS TO THE ISLES OF PENANCE, Orchid Gathering in the East, 320 pages, 54 illustrations. John Long Ltd., London, England, 1911.



Map of Nicobar and Andaman Islands from Clifton, Pilgrims to Isles of Penance.

Mrs. Clifton has many interesting stories and much information. On March 22nd, the Chief Commissioner lent his yacht, the Nancowrie, escorted by the Forest Officer and manned by convicts, for a trip to Rutland Island, south of the Main Island.

Mrs. Clifton records her impressions as follows:

"We afterwards went into a mangrove swamp, and the convicts again carried me on a heavy chair swung on poles . . . but they puffed and grunted so much that I did not lack mercy sufficiently to continue in this way, and therefore I got off. We plunged up to our knees in the swamp. I had a very short khaki dress on fortunately, but I shall wear Talbot's knickers in the future. When we reached the trees, they presented a most weirdly beautiful sight, for they are very tall, like the great pillars of a vast cathedral. Their stems are straight as mighty columns, and their branches form arches high up over the earth. The crowning mass of foliage resembles the domed roof of a temple not built by man. The roots of the trees are aerial, which adds still more to their architectural effect. We went on in the dim jungle till we reached a stream with delicate white flowers overhanging it, deliciously scented, very stars in this dense forest, eternally shading these colorless blossoms, which seemed like children in a city, pale for want of light. We sent a convict up the trees for them, as they were covered with ants. When we saw them close, to our joy they were *Phalaenopsis tetraspis*. I suppose I am the only white woman who has ever seen these growing wild.

"We then cruised (March 23rd) to the other side of Rutland, and taking a launch, went up a creek in a mangrove swamp. As we went we scanned the trees for orchids, and stopped when we saw any, and then My Myi (Burmese petty officer) clambered ashore and cut them down for us. We found some dendrobiums, which were the most prevalent species, also some *Aerides* in the darkness of the jungle, colorless for want of sun, but marvellously sweet-scented. We saw again the delicate outlines of the *Phalaenopsis tetraspis,* as usual covered with ants when My Myi got it down. It is a good one, but we doubt its reaching England alive. *Phalaenopsis* are most difficult to manage, as one cannot dry them off like the others. Edward, who was with us, had orders to sprinkle it every day with fresh water. We walked for about two miles, through a jungle full of variegated trees, down a good track, part of which had been laid for a trolley. This clearing made our progress easier than it would have been had we been obligated to thrust our way through the pathless jungle.

"Wherever we go one or two Sikh guards follow us, lest the convicts should kill us. . ...

"Of the orchids which we found during this pilgrimage were *Aerides, Vanda teres,* and *Phalaenopsis,* besides cymbidiums and dendrobiums. Upon our return to Port Blair these plants were dried in the wind by putting them on long strings in our bungalow verandah, a shady place being necessary for them. . . . After about a week we packed them in boxes with plenty of air holes, behind which a fine wire net was nailed to prevent cockroaches getting in and eating the bulbs. . . . The *Phalaenopsis* in spite of careful tending by Edward, were quite dead by the time we reached our bungalow (Ross Island). These orchids have to be sent home in a totally different way from the others, as they are much more delicate. . . . They are difficult to grow when they do survive the homeward journey."

Phalaenopsis sumatrana Korth. & Rchb.f. in Hamburg. Gartenz. 16:115, March 1860; Sweet in Amer. Orch. Soc. Bull. 37:1094, 1968.

Type: Sumatra, without precise locality. Coll. Korthals Icon. no. 443! (K).

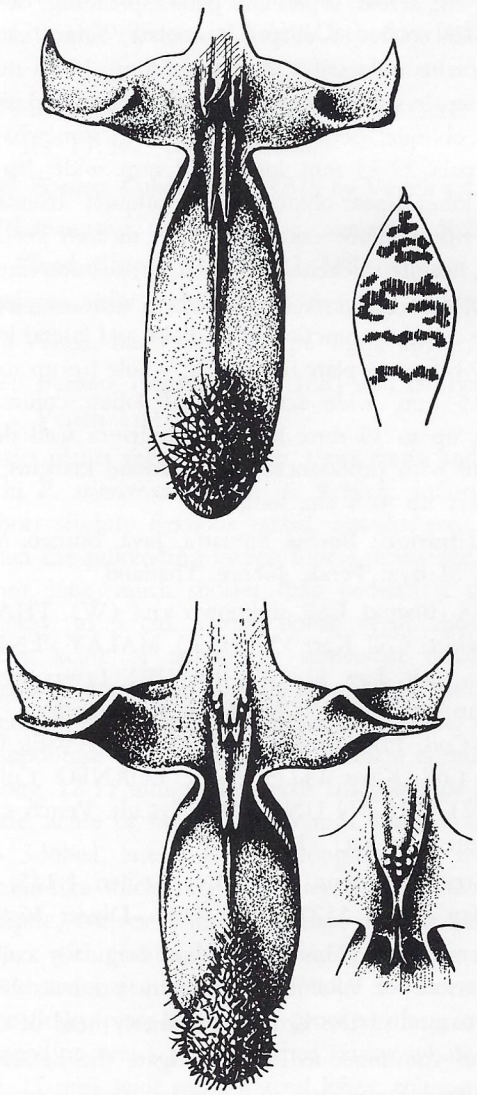
Syn.: *Phalaenopsis zebrina* Witte in Ann. Hort. Bot. Leiden 4:145, t., 1860 (*post Julio*).

Phalaenopsis zebrina Teijs. & Binn. in Natuurk. Tijdschr. Nederl. Indië 24:319, 1862.

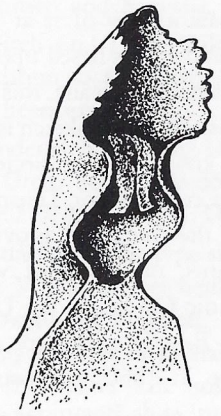
Type: Sumatra, Prov. Palembang. Gersen s.n. (BO).

Phalaenopsis acutifolia Linden in Lindenia 2:11, 1886, *lapsus typogr.*

Epiphytic, robust; roots many, flexuous, glabrous; stem short, completely covered by persistent leaf-sheaths; leaves fleshy, arcuate or pendent, oblong-elliptic to obovate, acute or rounded, slightly tapering toward articulate base, 15-30 cm. long, 4-11 cm. wide; inflorescence erect or slightly arcuate, a loosely, several- to many-flowered raceme, occasionally with a few branches, up to 30 cm. long including slightly fractiflex rachis; bracts triangular, cucullate, up to 6 mm. long, shorter than pedicellate ovaries; flowers fleshy,



Dorsal sepal and lips of *P. sumatrana.* Drawn from type.



Column of *P. sumatrana.* Drawn from type.

up to 5 cm. across; sepals and petals spreading; dorsal sepal oblong-lanceolate to elliptic-lanceolate, acute, canaliculate above, carinate dorsally, 20-40 mm. long, 10-15 mm. wide; lateral sepals similar to dorsal sepal in size and shape, but slightly oblique; petals lanceolate, acute, somewhat smaller than sepals, 22-35 mm. long, 9-12 mm. wide; lip 3-lobed; lateral lobes linear-oblong with obliquely truncate semi-falcate tip; midlobe convex, with a median keel, oblong-elliptic, heavily thickened toward apex, cushion-like, densely hirsute; disc between lateral lobes with varying multi-digitate callus; at junction of midlobe and lateral lobes with a fleshy bifurcate plate-like callus; whole lip up to 25 mm. long, 15 mm. wide across lateral lobes; column fleshy, arcuate, up to 15 mm. long; clinandrium well developed, cucullate with pronounced erose-dentate margins; pedicellate ovary up to 4 cm. long.

Distribution: Burma, Sumatra, Java, Borneo, Mentawei Islands. Malaya: Perak, Johore. Thailand.

BURMA. Bhamo. Coll. unknown s.n.! (W). THAILAND. Kaokalakiro. Coll. Kerr 552! (C,K). MALAY PENINSULA. Malacca. Cult. Low 8! (W), 15! (W). Lawas River. Coll. Burmann s.n.! (W). SUMATRA. Korthals Icon. no. 443! (K,L); Coll. Praetorius s.n. (L). MENTAWEI ISLAND. Sipora. Coll. Kloss 14773 ex lit. BORNEO. Coll. Boxall s.n.! (W). ORIGIN UNKNOWN. Cult. Veitch s.n.! (BM, W); Cult. Day s.n.! (K,W).

Illustrations: Ann. Hort. Bot. Leiden 4:145, t., 1860; Bot. Mag. 91: t. 5527, 1865; Orch. Digest 36:88, 1972.

Observations: This species was originally collected in the Province of Palembang, Sumatra prior to 1839 by a Dutch naturalist, Dr. Korthals, formerly head of the scientific staff commissioned to investigate the natural history of the Dutch possessions in the Malay Archipelago. Korthals prepared a sketch of his plant which was seen by Reichenbach in Leiden in 1856. At that time Reichenbach was not allowed to make a copy of Korthals' drawing. A few months later, however, he saw a copy of it at Twinham Green in Lindley's collection and it was based upon this that he made his description. Reichenbach calls this species the Zebra phalaenopsid. Korthals' original sketch is preserved at Leiden and was all that was known of this species until it was rediscovered by Gersen, a collector for Teijsmann in 1859 along with *P. violacea* in the Sumatran province of Palembang. Teijsmann sent plants, only one of which survived the journey, to the Botanic Garden at the University of Leiden under the name of *P. zebrina,* where it flowered for the first time in Europe in 1860, and was illustrated in the Annales d'Horticulture et de Botanique ou Flore des Jardins Royaume des Pays-Bas 4:145, 1860. This species was introduced into England by Messrs. Low & Co. in 1864 and flowered for the first time in the collection of John Day at Tottenham who exhibited it at the Royal Horticultural Society at South Kensington on May 30, 1865, when it received a First-class Certificate. This plant is illustrated in Curtis's Botanical Magazine 91: t. 5527, 1865.

Curtis found it again in 1881 in the hot, damp forests of Palembang growing on tree trunks, well-shaded, overhanging streams and water-courses in association with *P. violacea.*

The name *Phalaenopsis acutifolia* is merely a printer's error in the beginning of the description; using italic instead of Roman type it appears to be a newly proposed binomial.

The base color of the flowers varies from off-white to pale lemon-yellow and even to greenish yellow, especially with a greenish suffusion toward the apex of the floral segments. The sepals and petals are transversely barred with cinnamon to brownish red stripes or bars. The lip has two magenta stripes or interrupted stripes on both sides of the median keel.

The following varieties are recognized:

Phalaenopsis sumatrana var. **alba** G. Wilson in The Orchid World 5:146, 1915; Sweet in Amer. Orch. Soc. Bull. 37:1095, 1968.

Type: Introduced from Indonesia (Java). No type specimen preserved.

Flowers white, lip with three delicate wine-red stripes on each side of the midlobe; lateral lobes light yellow.

Observations: Mr. L. Schmid of Sourabaya, Java, flowered this variety in his collection for the first time in November 1913. In a letter to Gurney Wilson (The Orchid World 5:146, Apr. 1915) he writes: "As you will readily see from the photographs the blossoms are pure white, with the exception that on both sides of the lip there are three delicate wine-red stripes, whilst the sides of the lobes present a light yellow appearance. Contrasting with my other plants of *P. sumatrana,* of which I possess four or five varieties, and for which Sourabaya does not seem a suitable habitat, the alba form seems to feel itself perfectly at home here, and the blossom is moreover fairly large."

Possibly this variety may be the unspotted form of *P. sumatrana* var. *paucivittata.*

Phalaenopsis sumatrana var. **Kimballiana** Rchb.f. in Gard. Chron. ser. 3, 4:6, 1888; Sweet in Amer. Orch. Soc. Bull. 37:1098, 1968.

Type: Origin unknown. Introduced in 1888. Cult. Sander. Icon. Reichenbach no. 22338! (W).

There is no material of this variety available. Reichenbach's drawing suggests it may be referable to *P. Kimballiana* Gower, a synonym of *P. Reichenbachiana,* on the one hand, while on the other it displays the characteristics of the section *Amboinenses.* Until the type material is found it is better to list it as originally published by Reichenbach, who describes the flower as follows: "sepals and petals rather broad, bright yellow, with red transverse bands. Lip light-ochre-coloured; callus of the side laciniae (one on

each side) orange, keel at the base of the mid lacinia well developed. Hairs on the anterior part of the lip uncommonly few, P. fasciata is similar, but very distinct in the details of the lip."

The fact that the lip has few hairs at the tip, and the column, as depicted by Reichenbach, lacks the hooded clinandrium suggests a possible hybrid origin.

Godseff on behalf of Sander wrote to Reichenbach on June 25, 1888, as follows: "We sent you the other day flowers and leaf of a Phalaenopsis. Mr. Sander is not here now, but I feel sure he would be pleased if you were to name it after W. J. Kimball of Rochester, New York. He is the John Day of America and would much appreciate the honour."

Phalaenopsis sumatrana var. **paucivittata** Rchb.f. in Gard. Chron. n.s. 17:628, 1882; Sweet in Amer. Orch. Soc. Bull 37:1101, 1968.

Syn.: *Phalaenopsis sumatrana* subvar. *paucivittata* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:40, 1891.

Type: Origin unknown. Introduced and cultivated by Veitch s.n.! (W).

Sepals and petals milk-white with few (3-4) cinnamon-purple bars; 2 mauve stripes on each side of the midlobe of the lip.

PRIMARY CROSSES

Phalaenopsis sumatrana Korth. & Rchb.f.

× *P. amabilis* = *P.* × *Sumabilis.* 1938 (Atherton)
× *P. amboinensis* = *P.* × *Ambotrana.* 1965 (Thornton)
× *P. Corningiana* = *P.* × Double Eagle. 1974 (Dobkin)
× *P. cornu-cervi* = *P.* × Tiger Cub. 1972 (Wallbrunn)
× *P. equestris* = *P.* × *Equitrana.* 1967 (Thornton)
× *P. fasciata* = *P.* × Kathy Kornahrens. 1973 (Fort Caroline Orchids: Wallbrunn)
× *P. fimbriata* = *P.* × *Fimbritrana.* 1970 (Wallbrunn)
× *P. gigantea* = *P.* × David Ai. 1977 (Irene Dobkin)
× *P. Lueddemanniana* = *P.* × Elizabeth Todd. 1970 (Fort Caroline Orchids)
× *P. Mariae* = *P.* × James Burton. 1978 (MAJ Orchids)
× *P. Micholitzii* = *P.* × Sumitz. 1974 (Wallbrunn)
× *P. Stuartiana* = *P.* × Susanti. 1975 (Kolopaking)
× *P. violacea* = *P.* × *singuliflora* J. J. Smith. 1932 (Nat. hybr.)
× *P. violacea* = *P.* × Sulaceous. 1975 (Fort Caroline Orchids: Wallbrunn)

It is not always possible to determine what the hybridizer had in hand because varietal names have not appeared in the parentage. This should be kept in mind, since *Phalaenopsis sumatrana* var. *sanguinea* in this work is treated as a synonym of *Phalaenopsis Corningiana.*

Phalaenopsis Corningiana Rchb.f. in Gard. Chron. n.s. 11:620, 1879; Sweet in Amer. Orch. Soc. Bull. 37:1101, 1968.

Syn.: *Phalaenopsis Cumingiana* Rchb.f. in Gard. Chron. n.s. 15:562, 1881, *Sphalm.*

Type: Borneo. Cultivated in 1879 by Veitch s.n.! (W).

Phalaenopsis sumatrana var. *sanguinea* Rchb.f. in Gard. Chron. n.s. 15:782, 1881.

Phalaenopsis sumatrana subvar. *sanguinea* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:40, 1891.

Type: Borneo. Introduced in 1881 and cultivated by Veitch s.n.! (W).

Epiphytic; plants vegetatively, i.e., roots, stems and leaves same as in *P. sumatrana* Korth. & Rchb.f.; inflorescence with a short slightly flexuous rachis, few-flowered, much shorter than the subtending leaves; bracts triangular, cucullate, 5 mm. long, much shorter than pedicellate ovaries; flowers fleshy, to 5 cm. across; dorsal sepal obovate to oblanceolate, acute or subobtuse, somewhat canaliculate above, carinate dorsally, 30-40 mm. long, 10-13 mm. wide; lateral sepals ovate, oblique, somewhat canaliculate toward acute or subobtuse apex, prominently carinate dorsally, 25-30 mm. long, 12-15 mm. wide; petals lanceolate or lanceolate-obovate, acute or obtuse, 25-35 mm. long, 8-12 mm. wide; lip 3-lobed, lateral lobes oblong-ligulate, truncate, with cushion-like thickening in center; midlobe narrowly oblong-elliptic, convex with a median, lamella-like thin keel; at apex with cushion-like thickening or callus densely covered with hairs; at junction of midlobe and lateral lobes a bifurcate fleshy plate-like callus, grooved along midline, basally extending into a pocket-shaped cavity; whole lip 20 mm. long, 17 mm. wide across lateral lobes; column fleshy, arcuate, with a well-developed hood-like clinandrium with grossly erose-dentate margins, very similar to *P. sumatrana* Korth. & Rchb.f.; pedicellate ovary cylindric, to 4 cm. long.

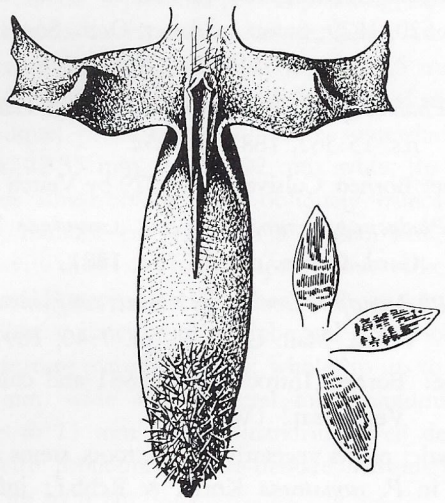
Distribution: Borneo and Sarawak.

BORNEO. Cult. Veitch s.n.! (W); Cult. Veitch s.n.! (W). SARAWAK. In addition to the above types, a number of living flowers have been examined.

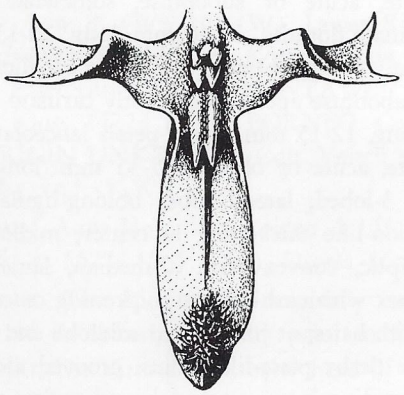
Illustrations: Lindenia 8: t. 366, 1893 (as *P. Lueddemanniana*); Amer. Orch. Soc. Bull. 35:752, 1966 (as *P. sumatrana*); *ibid.* 40:777, 1971; Orch. Digest 40:105, 1976.

Observations: Attached to the type sheet of *P. Corningiana* is a letter from Veitch to Reichenbach, dated May 2, 1879, with the following information: ". . . In very great haste I send you today a flower of a Phalaenopsis purchased yesterday at Revd. Norman's sale sold as per enclosed memo. . . ." The memo apparently is a clipping from a printed auction catalogue, page 28. The item reads as follows: "676 PHALAENOPSIS, EDWARD DE ALNIDA, OR VIOLACEA, a very rare and beautiful variety from Singapore."

This would indicate that it was native to the Malayan



Floral details of *P. Corningiana.* Drawn from type.



Lip of *P. sumatrana* var. *sanguinea,* a synonym of *P. Corningiana.* Drawn from type.

Peninsula. But, we also know that many plants came out of Singapore at that time, though their origin was elsewhere. During the early 1970s many plants of this species were imported from Sarawak which originally was the source of *P. sumatrana* var. *sanguinea.* Some of the flowers which I have seen from Sarawak (British North Borneo) have a deep crimson or mahogany-red barring and a few have been uniformly colored a deep crimson or mahogany-red. Many of those from Sarawak tend to have smaller flowers.

Since *P. sumatrana* var. *sanguinea* and *P. Corningiana* are really indistinguishable, the former name becomes a synonym of *P. Corningiana.* Both have a well-developed hood-like clinandrium. The apical halves of the sepals and petals are barred longitudinally or lengthwise with cinnamon-colored to mahogany-red to crimson stripes or bars (not crosswise or transverse as in *P. sumatrana*) on a pale greenish yellow ground color. Dorsally the floral segments are a uniform pale yellow. The midlobe of the lip and the base of the column are of a deep magenta-carmine, while the lateral lobes of the lip and the rest of the column are white. The callus on each lateral lobe is an orange-yellow.

Stein in *Orchideenbuch,* page 506, states that *Phalaenopsis Harriettae* Rolfe — a hybrid between *P. amabilis* and *P. violacea* — is the same as *P. Corningiana.* This statement is erroneous.

Harry J. Veitch sent a flower to Reichenbach and wrote on May 2, 1879, as follows: "If new I want you very kindly to name it after Erastus Corning, Esq., the Pioneer of Orchid growing in America . . . and if you can do so please name it after him as he is a capital customer and we want to pay him a compliment."

In the original description Reichenbach says, "I have to thank Messrs. Veitch for this extraordinary species. It is dedicated with empressement to Erastus Corning, Esq., the pioneer of Orchid growing in America and whose collection at Albany, New York, is now so famous."

Primary Hybrids

Phalaenopsis Corningiana Rchb.f.

× *P. sumatrana* = *P.* × Double Eagle. 1974 (Dobkin)

× *P. violacea* = *P.* × Corning's Violet. 1976 (Sheviak)

It is not always possible to determine what the hybridizer had in hand because varietal names have not appeared in the parentage. This should be kept in mind, since *Phalaenopsis sumatrana* var. *sanguinea* in this work is treated as a synonym of *Phalaenopsis Corningiana.*

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Subsection **LUEDDEMANNIANAE** Sweet. See page 15.

Column with non-developed, low, marginate, entire clinandrium or anther bed; lip between lateral lobes with variously tuberculate callus, never simply bifid.

Type: *Phalaenopsis Lueddemanniana* Rchb.f.

Enumeration of Species

Phalaenopsis pulchra (Rchb.f.) Sweet in Amer. Orch. Soc. Bull. 37:1102, 1968.

Basionym: *Phalaenopsis Lueddemanniana* var. *pulchra* Rchb.f. in Gard. Chron. n.s. 4:36, 1875.

Syn.: *Phalaenopsis Lueddemanniana* subvar. *pulchra* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:31, 1891.

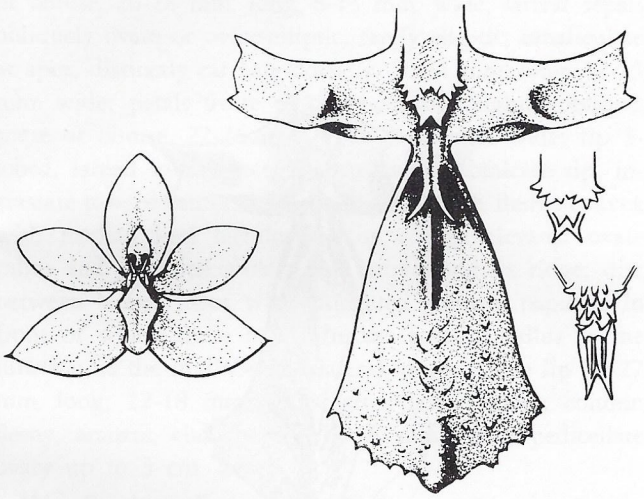
Type: Introduced from Philippines by Low 187! Reichenbach Herbarium Nr. 22353 (W).

Phalaenopsis Lueddemanniana var. *purpurea* Ames & Quisumb. in Phil. Jour. Sci. 49:494, t. 2, figs. 6, 7, t. 10, 24, 1932.

Type: Philippines. Luzon Island. Prov. Nueva Ecija, Balete Pass. Coll. Constinoble s.n.! (AMES photo, PNH).

Epiphytic, suberect or ascending; roots fleshy, somewhat flexuous, glabrous; stem much abbreviated, completely enclosed by imbricating leaf sheaths; leaves suberect, arching,

oblong-elliptic to narrowly obovate, fleshy, acute or subobtuse, up to 15 cm. long, 6 cm. wide; inflorescence lateral, suberect or arching, commonly shorter than leaves, a laxly few-flowered raceme; bracts short, triangular, acute; flowers fleshy, subdiaphanous, unicolored; dorsal sepal erect, elliptic or oblanceolate-elliptic, acute, slightly canaliculate toward tip, carinate dorsally, 19-25 mm. long, 9-13 mm. wide; lateral sepals obliquely ovate, acute or subobtuse, slightly canaliculate toward tip, carinate dorsally, 19-28 mm. long, 10-15 mm. wide; petals obliquely elliptic or ovate-elliptic, acute or obtuse, distinctly tapered toward base, 18-23 mm. long, 8-11 mm. wide, lip 3-lobed, fleshy, lateral lobes erect



Floral details of *P. pulchra*. Drawn from type.

in natural position, oblong-linear with subtruncate apex, in middle with cushion-like thickening; midlobe flabellate or ovate-flabellate, acute, margin in front irregularly erose-dentate; disc between lateral lobes with a quadrate plate-like thickening, the anterior margin of which is dissolved in papillae or elongated papilla-like protuberances; in front of these papillae there are one or two superimposed bifid plate-like calli; at junction of midlobe and lateral lobes provided with a fleshy bifurcate acicular projection; along center of midlobe the high elevated keel with an irregular dentate edge in front; disc of midlobe covered with scattered shallow papillae and with callus-like swelling at the apex; between swelling and central keel a few stiff, scattered hairs; length of whole lip 17-23 mm., 16-20 mm. wide across lateral lobes; column fleshy, erect or slightly arcuate and clavate, 8-13 mm. high. Chromosome no. $2n = 38$.

Distribution: Philippine Islands. Luzon Island and Leyte Island.

PHILIPPINES. Island unknown. Cult. Low 187! (W). Luzon Island. Prov. Nueva Viscaya, Dupax. Coll. McGregor 11137! (AMES,K). Prov. Nueva Ecija, Balete Pass. Coll. Constinoble s.n. (PNH). Leyte Island. Jaro. Coll. Wenzel 910! (AMES). Also many living cultivated flowers have been studied.

Observations: Although originally this species was regarded merely as a variety of *Phalaenopsis Lueddemanniana*, it deserves a specific status for its flowering period is usually during midsummer, July and August, whereas *P. Lueddemanniana* tends to flower earlier in the spring. Moreover, the color of the flower is very distinct, being uniformly brilliant deep magenta-purple without the obvious characteristic transverse bars. The pigments are located in the tissue on the ventral surface of the sepals and petals, i.e., in front, while dorsally (back) the sepals and petals are of silvery white. In looking at the flower with transmitted light, one does notice a faint striped or barred appearance in every flower, even those uniformly colored. This was also observed and noted by Reichenbach. Finally a comparison of the morphological details of the lip of this species and *P. Lueddemanniana* shows additional differences so that the union of the two species could only be based solely on superficial resemblances. There is a noticeable difference in the shape of the lip, especially the apex of the midlobe. The structure in *P. pulchra* is erose-denticulate or toothed or even in some specimens almost fringed or fimbriated. In *P. Lueddemanniana* the cushion at the apex is more pronounced and more hairy than in *P. pulchra* which has only a few hair-like extensions. The plate-like callus between the lateral lobes is quite dissimilar in both composition and general shape, when viewed against one another.

An examination of the type of both *P. Lueddemanniana* var. *pulchra* and *P. Lueddemanniana* var. *purpurea* failed to disclose any morphological differences. That we are dealing here with a natural spread of variation in color is strengthened by the following note received from my valued friend, Oscar M. Kirsch: ". . . it was found in a rather unaccessible area of the Philippines and, while at first considered very rare, was soon exported, mostly to Hawaii, by the hundreds. Many of the specimens were only little keikis, most of them so poor that only about half survived fumigation and quarantine. When they came into bloom there was a wide range of types. Some were solid red, which we considered the true *P. Lueddemanniana* var. *purpurea* and many others showing a variety of patterns of red against a light background, much like we used to call *P. Lueddemanniana* var. *pulchra*. . . ."

Under *Phalaenopsis speciosa* I have referred to the fact that both *P. pulchra* and *P. speciosa* have been confused with one another in the horticultural trade. Notwithstanding the great similarity in the color of *P. speciosa* var. *Imperatrix* and *P. pulchra,* a close examination readily differentiates between the two. *Phalaenopsis pulchra* does not possess the heavy hairy, cushion-like callus on the apex of the midlobe of the lip, nor do the two look alike in the shape of the lip. The difference is perhaps most pronounced in the structure of the column. *Phalaenopsis pulchra* lacks the prominent flare so characteristic of *P. speciosa.* Up to the present (1979) I have not received *P. speciosa* from any one and I doubt that *P. speciosa* is currently in cultivation.

Unfortunately the International Registration Authority for Orchid Hybrids of the Royal Horticultural Society, London, England, no longer recognizes for registration purposes *Phalaenopsis pulchra* as a species distinct from *P. Lueddemanniana.* This simplistic approach raises havoc with the scientific nomenclature as well as producing a situation in which highly heterogenous and different hybrids must be called by names which do not reflect their true parentage and genealogy.

Phalaenopsis Reichenbachiana Rchb.f. & Sander in Gard. Chron. n.s. 18:586, 1882; Sweet in Amer. Orch. Soc. Bull. 38:33, 1969.

Type: Philippines. Mindanao Island. Coll. Micholitz s.n.! (W).

Syn.: *Phalaenopsis Kimballiana* Gower in The Garden 34:13, 1888.

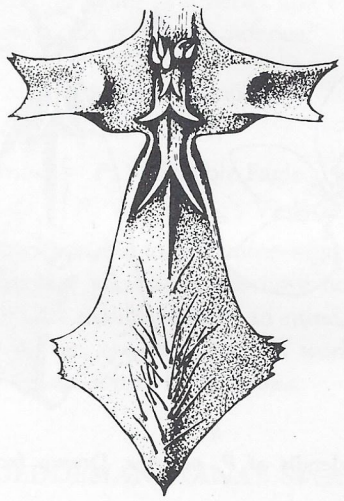
Type: Philippines. Island unknown. Cult. Weathers s.n.! (BM).

Epiphytic; roots heavy, coarse; slightly flexuous, glabrous; stem robust, short, to 5 cm. long, densely covered with imbricating leaf sheaths; leaves suberect or arcuate, obovate-oblanceolate or elliptic-obovate, rounded at apex, gradually tapering to base, 15-35 cm. long, 5-7 cm. wide; inflorescence up to 45 cm. long, suberect or arcuate, as long as or longer than leaves, loosely racemose above, at times becoming branched; bracts short, triangular-cucullate, acute, 5 mm. long; flowers about 4 cm. across, waxy, fleshy; sepals and petals spreading; lip porrect; dorsal sepal elliptic or elliptic-ovate, acute, slightly canaliculate, indistinctly carinate dorsally toward tip, 20-25 mm. long, 9-11 mm. wide; lateral sepals obliquely ovate to ovate-lanceolate, rarely elliptic, acute, dorsally indistinctly carinate-mucronate at tip, 25-30 mm. long, 10-12 mm. wide; petals obliquely ovate or ovate-elliptic, acute, distinctly and abruptly tapered at base, 20-24 mm. long. 10-12 mm. wide; lip 3-lobed; lateral lobes oblong-linear, erect with cushion-like thickening in middle, emarginate at apex; midlobe trulliform, acute, on both sides the margin at points irregularly denticulate; disc between lateral lobes cushion-like, swollen, the swelling dissolves into retrorse elongated papillae, in front of which there is a double bifid plate-like callus; at junction of midlobe and lateral lobes with a bicirrhous acicular projection; center of midlobe provided with a high elevated keel which tapers into a cushion-like swelling covered with long, prominent hairs; whole lip 17-20 mm. long; width across lateral lobes 14-16 mm.; column fleshy, arcuate, clavate, 10-12 mm. long; pedicellate ovary 2.5 cm. long.

Distribution: Endemic in the Philippines. Mindanao Island.

PHILIPPINES. Mindanao Island. Coll. Micholitz s.n.! (W). Island unknown. Coll. Weathers s.n.! (BM). Also living flowers have been studied.

Observations: This unique species is readily identifiable not only from the shape of the lip, but also from the color of the flower. It is poorly understood because of its paucity in cultivation. The sepals and petals are greenish white to greenish yellow to yellow with reddish brown or cinnamon-colored, rarely sepia, transverse bars, strikingly similar to those of *P. fasciata.* The main distinction, however, is in the general configuration of the lip. The lateral lobes of the lip are whitish with yellow calli and without any markings. The basal part of the lip is orange-yellow, while the apical portion of the midlobe as well as the base of the column are magenta and amethyst-purple, similar to *P. fasciata.* However, the calli between the lateral lobes are



Lip of *P. Reichenbachiana.* Drawn from type.

quite distinct from any of the other species in having rather short and stout retrorse callosities as shown in the ink drawings. Another outstanding feature of this species is the sharply pointed rhomboid midlobe which is provided with a callus covered with long stiff hairs.

In addition to *Phalaenopsis fasciata* this species has been confused with *P. Lueddemanniana* var. *ochracea.* This latter variety has no retrorse callosities between the lateral lobes of the lip, and the shape of the midlobe of the lip is quite different.

Although Gower's description of *P. Kimballiana* is far from adequate for positive identification, however, through a specimen preserved in the Herbarium of the British Museum of Natural History, London, England, its identity was established. The retrorse callosities and the hairy lip place it with *P. Reichenbachiana.* Also the measurements of the floral segments are identical with this latter species.

Micholitz states that this species grows in light shaded areas and is very rare.

Phalaenopsis fasciata Rchb.f. in Gard. Chron. n.s. 18:134, 1882; Sweet in Amer. Orch. Soc. Bull. 38:33, 1969.

Type: Philippine Islands. Introduced and cultivated in 1882 in England by Low s.n.! (W).

Plants epiphytic; roots numerous, fleshy, glabrous; stem short, completely covered with imbricating leaf sheaths; leaves distichous, elliptic to obovate-elliptic or obovate, obtuse or rounded, canaliculate above, carinate dorsally, 14-20 cm. long, 6-7.5 cm. wide; inflorescence lateral, suberect or arcuate, longer than subtending leaves, racemose above; rachis fractiflex; bracts triangular, acute, cucullate, up to 4 mm. long; flowers fleshy, waxy; sepals and petals spreading, lip porrect; dorsal sepal elliptic or ovate-elliptic, acute or obtuse, 20-28 mm. long, 8-13 mm. wide; lateral sepals obliquely ovate or ovate-elliptic, rarely elliptic, canaliculate at apex, distinctly carinate dorsally, 20-31 mm. long, 12-15 mm. wide; petals ovate to ovate-elliptic, slightly oblique, acute or obtuse, 22-26 mm. long, 9-13 mm. wide; lip 3-lobed, lateral lobes erect, ligulate with subfalcate tip, incrassate toward center; midlobe oblong-ovate, fleshy, convex with median keel terminating in a high elevated ovate callus and provided with a few hairs along its ridge; disc between lateral lobes with elongated retrorse papillae, in front of which there is a bifurcate acicular callus at the junction of the midlobe and lateral lobes; whole lip 20-27 mm. long; 12-18 mm. wide across lateral lobes; column fleshy, arcuate, club-shaped, 12-16 mm. long; pedicellate ovary up to 3 cm. long.

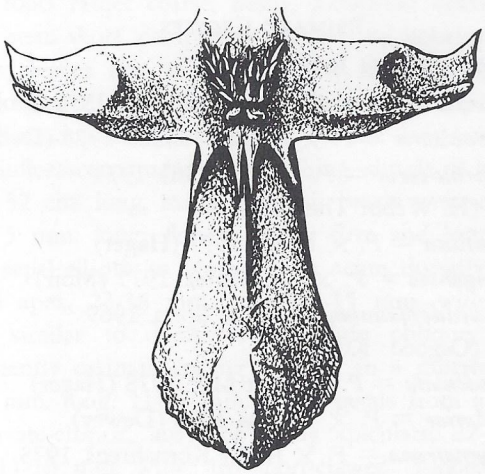
Distribution: Endemic in Philippine Islands: Luzon, Bohol, Mindanao Islands.

PHILIPPINES. Cult. Low s.n.! (W). Luzon Island, Manila. Coll. Quisumbing s.n.! (AMES). Prov. Bataan, Mt. Mariveles. Coll. Merrill 3849! (AMES). Bohol Island, Batuan River. Coll. Ramos 4267! (AMES,L,P,NY,US). Mindanao Island, Davao. Coll. Loher 5385! (K). Also many living cultivated flowers have been studied.

Illustrations: Orch. Dig. 35:302, 1971; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 9, 1974.

Observations: This species is common in cultivation today often under incorrect names. The flowers of *Phalaenopsis fasciata* have a similar ground color as do several other species of *Phalaenopsis*: *P. pallens, P. sumatrana, P. amboinensis.* It varies from a light yellow to a deep yellow, even an orange-yellow, often with a greenish hue. The sepals and petals are of heavy substance, firm and waxy, and marked with rather prominent reddish brown to cinnamon transverse or horizontal bars, rather than thin lines and dashes. The yellow lateral lobes of the lip dotted with red have orange calli. The midlobe is bicolored — vivid orange-yellow at the basal third and magenta at the apex. When the lip is examined under a hand lens the retrorse, i.e., curved backward toward the base, toothleted plate or callus between the lateral lobes is an important diagnostic feature of this species. This character is clearly shown in the ink drawing. The apex of the midlobe has a fleshy cushion-like callus with a few scattered hairs.

Reichenbach offers the following comments: "This is like Phalaenopsis sumatrana in the shape of the light yellow sepals and petals which have numerous cinnamon bars. The lip has sulphur-colour lateral divisions, which are retuse, and have a blunt keel with a knob parallel to the anterior margin. Between both on the disc is a number of retrorse toothletted orange plates, and two conical papulae terminating in bristles stand before the base of the median partition. The latter is oblong ligulate (blunt), with a deep abrupt, membranous keel. The anterior part of it is light purple, the superior orange. There is no cushion of hairs, as in P. sumatrana and Lüddemanniana; hence, according to artificial characters, it might be regarded as nearest to Phalaenopsis violacea, yet the shape of the sepals and petals is markedly different. The sepals have no median keels outside. The top of the lip is totally distinct also. Leaves and roots are said to be quite like those of Phalaenopsis Lüddemanniana."



Lip of *P. fasciata.* Drawn from type.

This species, like *P. Reichenbachiana,* has been confused with *P. Lueddemanniana* var. *ochracea.* The distinction in the lip shape as well as the retrorse callosities between the lateral lobes of the lip immediately exclude this species from the varieties of *P. Lueddemanniana.*

In addition to its lip shape it may be separated from *P. Reichenbachiana* by the coloration of the lip with its yellow lateral lobes dotted with red; *P. Reichenbachiana* has white or pale greenish yellow lateral lobes without red dots.

Attention should be called to a photograph in the American Orchid Society Bulletin 34:217, 1965 (left) where this species is labeled *P. Lueddemanniana* var. *ochracea.* Furthermore, in that very same article another illustration has the name *P. Lueddemanniana* var. *fasciata* attached, which is

unfortunate, since no such combination or variety has ever been described. This particular illustration on page 217 (right) represents *P. pallens.*

The need for caution and care that one must exercise in applying names cannot be emphasized strongly enough. The indiscriminate application of names to plants which superficially look similar greatly hampers the validity and credibility of claims when submitted for judging or registration, or when offered for sale. Indeed, one may wonder what the true parents are in the cross of *P. Lueddemanniana* var. *fasciata* × *P. cornu-cervi* which is mentioned in the July issue of Phalaenopsis World, or the cross registered as *P.* × Doubloon and discussed in the American Orchid Society Bulletin 34:227, 1965, not to mention *P.* × John Glenn, *P.* × Glenn Sparks, and *P.* × Jane Shaffer, for which the name *P. Lueddemanniana* var. *fasciata* is given for the first time as being one of the parents.

PRIMARY CROSSES

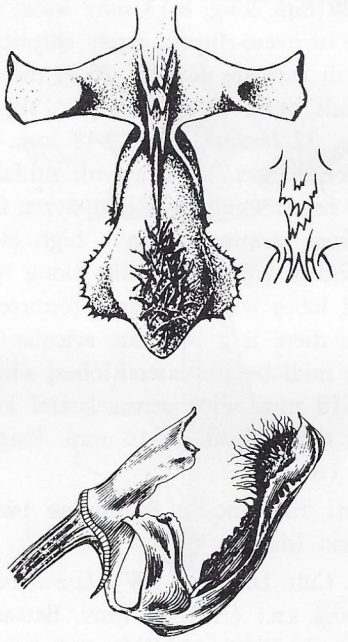
Phalaenopsis fasciata Rchb.f.

× *P. amboinensis* = *P.* × Golden Pride. 1975 (Dobkin)
× *P. cochlearis* = *P.* × Golden Jubilee. 1975 (Dobkin)
× *P. cornu-cervi* = *P.* × Little Girl. 1974 (H. Webb: Thornton)
× *P. fuscata* = *P.* × Mirth. 1977 (Hager)
× *P. gigantea* = *P.* × Reichentea. 1975 (Moir)
× *P. Lueddemanniana* = *P.* × Spica. 1969 (Osgood: Kuhn)
× *P. maculata* = *P.* × Little Mac. 1978 (Hager)
× *P. Mariae* = *P.* × Tigress. 1970 (Dewey)
× *P. sumatrana* = *P.* × Kathy Kornahrens. 1973 (Fort Caroline Orchids: Wallbrunn)
× *P. violacea* = *P.* × Norman. 1969 (Beard)

Phalaenopsis fimbriata J. J. Smith in Bull. Jard. Bot. Buitenz., ser. 3, 3:300, 1921; Sweet in Amer. Orch. Soc. Bull. 38:35, 1969.

Type: Indonesia (Java) Blitar in woods. Type cultivated in Botanical Gardens, Bogor, Indonesia (Java). Coll. Tollens s.n.! (L).

Epiphytic; roots elongate, slightly flexuous, glabrous; stem short, covered with imbricating leaf sheaths; leaves suberect, slightly arcuate, oblong-elliptic to elliptic-obovate, acute or obtuse, tapering toward base, canaliculate above, 14-23 cm. long, 3-7 cm. wide; inflorescence more or less recurved, laxly many-flowered, up to 27 cm. long; rachis obtusely quadrangulate; bracts persistent, small, ovate-triangular, 2-4 mm. long; flowers fleshy, all opening simultaneously; dorsal sepal elliptic or oblong-elliptic, obtuse or subacute, dorsally indistinctly carinate at apex, 15-20 mm. long, 6-9 mm. wide; lateral sepals obliquely ovate-elliptic to oblong-elliptic, acute or subobtuse, canaliculate above, distinctly carinate dorsally along midvein, 13-20 mm. long, 8-12 mm. wide; petals from cuneate base oblong-elliptic, obtuse or subacute, 15-18 mm. long, 6-8 mm. wide; lip 3-lobed, lateral lobes erect, obliquely quadrangular-oblong, with cushion-like swelling in middle, semifalcate at apex; midlobe convex, very fleshy, ovate-rhomboid in outline, with upcurved dentate-fimbriate margins, at apex with cushion-like ovoid callus densely covered with stiff hairs, in center with a median elevated lamella-like serrate keel; disc between lateral lobes with 2 superimposed plate-like calli, commonly bifid, at times lacerate-dentate, in front of which at the junction of midlobe and lateral lobes overlapping a bifid acicular fleshy projection; length of whole lip 14-16 mm., 10-14 mm. wide across lateral lobes; column



Lip and column of *P. fimbriata.* Drawn from type.

erect, fleshy, cylindric, 6-8 mm. long; pedicellate ovary 2-3 cm. long.

Distribution: Indonesia (Java) and Sarawak.

INDONESIA. Blitar. Coll. Tollens s.n.! (BO,L). Cult. Hort. Bogor! (BO,L); ex Hort. Bogor s.n.! (AMES,L). 'SARAWAK. Mt. Kinabalu. Coll. J. & M. S. Clemens 30124! (AMES). Also many living cultivated flowers have been studied.

Illustrations: Bull. Jard. Bot. Buitenz., ser. 3, 6; t. 12, f. 2, 1924; Orch. Dig. 35:46, 1971.

Observations: *Phalaenopsis fimbriata* was first discovered by J. J. Smith in 1921 from Indonesia (Java) and now it is known from Sumatra and more recently has been reported from Sarawak. Today it is common in cultivation.

This species is easily differentiated from other white, small-flowered *Phalaenopsis* (*P. speciosa* var. *tetraspis, P. hieroglyphica* and *P. Micholitzii*) by the densely fimbriate, upcurved margins of the midlobe of the lip and the cushion-

like discs on the apex of the midlobe of the lip covered with soft white hairs.

The flowers vary from a pure white to cream and even to a light green or greenish white. Occasionally some of the forms may have only green tips or a green suffusion on the sepals and petals. Another characteristic feature of this species is in the transverse magenta lines or bars on the basal half, especially the inner half, of the lateral sepals. However, some of the plants have flowers in which the magenta is entirely lacking or subdued. The pure white flowers without the magenta bars have been responsible for some of the confusions, since they have been incorrectly called "*P. speciosa* var. *tetraspis*" (*P. tetraspis* Rchb.f.). However, a comparison of floral details as shown on the ink drawing immediately rectifies this confusion. Hence, the similarity between *P. speciosa* var. *tetraspis* and *P. fimbriata* is at best superficial.

The midlobe of the lip and the mitten-shaped apical ends of the lateral lobes are usually a vivid magenta. The yellow calli on the lateral lobes add an enhancing contrast.

The following variety has been reported:

Phalaenopsis fimbriata var. **sumatrana** J. J. Smith in Bull. Jard. Bot. Buitenz., ser. 3, 12:145, 1932; Sweet in Amer. Orch. Soc. Bull. 38:35, 1969.

Type: Sumatra. Bengkoeloe, Rimbo Pengadang. Coll. Ajoeb. 195! (BO).

Flowers are white, lip purple and yellow. This variety differs from the type in somewhat larger flowers with narrower segments. The dorsal sepal is 27 mm. long, 8 mm. wide; lateral sepals 26 mm. long, 10 mm. wide; petals 25 mm. long, 7 mm. wide; lip 16 mm. long. Midlobe is strongly bent in upper part, serrulate on the margin and provided with a shorter and higher keel.

Distribution: Endemic in Sumatra.

Illustration: Orch. Dig. 40:85, 1976.

PRIMARY CROSSES

Phalaenopsis fimbriata J. J. Smith

× *P. amboinensis* = *P.* × Elaine-Liem. 1972 (Kolopaking)
× *P. cornu-cervi* = *P.* × *Corbriata.* 1968 (Thornton)
× *P. Mannii* = *P.* × *Manbriata.* 1968 (Thornton)
× *P. Micholitzii* = *P.* × Green Valley. 1972 (Thornton)
× *P. Parishii* = *P.* × Green Imp. 1973 (Thornton)
× *P. Stuartiana* = *P.* × Kuanida Kristanto. 1976 (Kolopaking)
× *P. sumatrana* = *P.* × *Fimbritrana.* 1970 (Wallbrunn)
× *P. violacea* = *P.* × Java. 1970 (Thornton)
× *P. Wilsonii* = *P.* × Bomantoro. 1979 (Kolopaking)

Phalaenopsis hieroglyphica (Rchb.f.) Sweet in Amer. Orch. Soc. Bull. 38:36, 1969.

Basionym: *Phalaenopsis Lueddemanniana* var. *hieroglyphica* Rchb.f. in Gard. Chron. ser. 3, 2:586, 1887.

Syn.: *Phalaenopsis Lueddemanniana* subvar. *hieroglyphica* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:31, 1891.

Type: Philippines. Island unknown. Introduced in 1887 and cultivated in England by Low. Coll. Boxall s.n.! (W).

Phalaenopsis Lueddemanniana var. *palawanensis* Quisumbing in Phil. Orch. Rev. 5 (3): 2, t., 1953.

Type: Philippines. Palawan Island. Coll. Edaño s.n.! (AMES).

Phalaenopsis Lueddemanniana var. *surigadensis* Hort. in Amer. Orch. Soc. Bull. 34:542, 1965. *Nomen.*

Plants epiphytic, in nature pendent, in cultivation suberect; roots rather coarse, fleshy, somewhat flexuous, glabrous; stem short, completely enclosed by imbricating leaf sheaths; leaves few to many, rather leathery in texture, oblong-ligulate, acute or obtuse above, gradually tapering toward conduplicate base, up to 30 cm. long and 9 cm. wide; inflorescence suberect or arching, simple or branched, up to 32 cm. long, many-flowered; bracts ovate-cucullate, acute, 5 mm. long; flowers rather firm and long-lasting; dorsal sepal elliptic to ovate-elliptic, acute, dorsally carinate toward apex, 23-38 mm. long, 10-15 mm. wide; lateral sepals similar to dorsal, but slightly oblique, dorsally prominently carinate ending at apex in a mucronate tip, 24-41 mm. long, 11-17 mm. wide; petals from a cuneate base ovate-elliptic, acute or rarely apiculate, 22-33 mm. long, 11-16 mm. wide; lip short-clawed, 3-lobed; lateral lobes obliquely oblong-linear with truncate-emarginate apex in the middle with cushion-like semi-globose callus; midlobe cuneate-flabellate, obscurely erose toward apex, from base to middle with fleshy keel merging into an ovoid callus covered with prominent hairs, the claw and disc between lateral lobes provided with a semi-cylindric, fleshy, glabrous callus terminating in numerous elongate, acicular digits, in front of which at junction of midlobe and lateral lobes a pair of bifid appendages; length of whole lip 20-25 mm., width across lateral lobes 14-18 mm.; column slightly arcuate, cylindric, up to 12 mm. long; pedicellate ovary to 2 cm. long. Chromosome no. $2n = 38$.

Distribution: Endemic in Philippine Islands: Islands of Luzon, Polillo and Palawan.

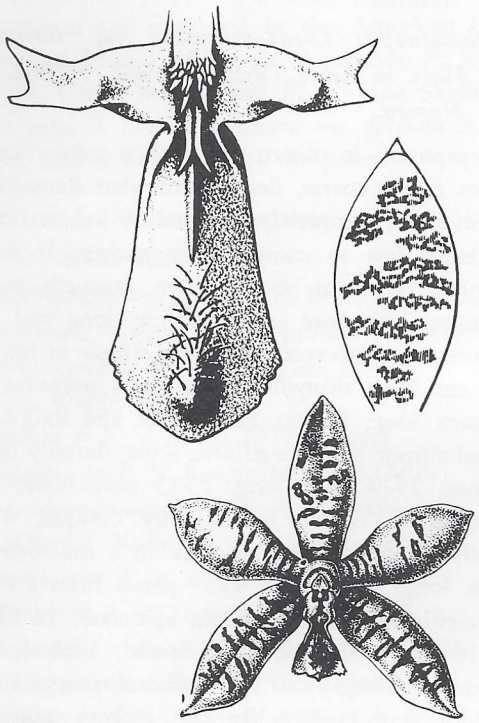
PHILIPPINES. Island unknown. Coll. Boxall s.n.! (W). Luzon Island. Prov. Cagayan, Apayao. Coll. Weber 338! (AMES). Polillo Island. Coll. McGregor 10437! (AMES). Palawan Island. Coll. Edaño s.n.! (AMES,PNH). Also many living cultivated flowers have been studied.

Illustrations: Orch. Dig. 35:46, 1971; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 5, 1974.

Observations: *Phalaenopsis hieroglyphica* was collected

by Boxall for Low who introduced it into cultivation in 1887. The species is common in cultivation in the United States and is being used in hybridization, especially with species of the section *Zebrinae*. This species presents little or no problem in its identification.

Although this species was recognized as a variety of *Phalaenopsis Lueddemanniana,* I fail to find any connecting links in the variation pattern of *P. Lueddemanniana,* both in color and morphology, which would include such extremes as this species exhibits. The unique color pattern,



Floral details of *P. hieroglyphica.* Drawn from type.

the very distinct basal callosity coupled with the unusually large size of the flower indeed warrant the recognition of a specific status.

Reichenbach offers the following comments: ". . . roots round and whitish-green. The flowers have light ochre-white sepals and petals narrower, and thus appearing longer than is a common Phalaenopsis Lüddemanniana. They are covered with small cinnamon circles or spots, or curious figures; the lip has very short side laciniae, and the mid lacinia is very cuneate, narrow, with an unusually developed keel at the base, and very few hairs at the convex top."

The ground color of the flowers varies from white to cream; sometimes the tips of the sepals and petals may be green or suffused with green. The sepals and petals are richly decorated with cinnamon-colored markings consisting of short bars and dots, so arranged as to resemble Egyptian hieroglyphics. Hence the specific name!

The examination of the type of *P. Lueddemanniana* var. *palawanensis* showed no differences either in color or in the shape from *P. hieroglyphica.*

Within the last several years an attractive horticultural form from the Province of Surigao on the northeastern part of Mindanao has been collected. The author has seen a single flower, which is full and round in outline. No varietal name has been legitimately assigned to it yet.

Unfortunately the International Registration Authority for Orchid Hybrids of the Royal Horticultural Society, London, England, no longer recognizes for registration purposes *Phalaenopsis hieroglyphica* as a species distinct from *P. Lueddemanniana.* This simplistic approach raises havoc with the scientific nomenclature as well as producing a situation in which highly heterogenous and different hybrids must be called by names which do not reflect their true parentage and genealogy.

Phalaenopsis Lueddemanniana Rchb.f. in Bot. Zeit. 23: 146, 1865; Sweet in Amer. Orch. Soc. Bull. 38:38, 1969.

Type: Philippine Islands. Introduced in 1865 and cultivated in Paris, France, by Lueddemann s.n.! (W).

Syn.: *Phalaenopsis Luddemannii* Boxall ex Naves Novis. App. 243, 1882. *Sphalm.*

Epiphytic, extremely variable in size; roots numerous, flexuous, glabrous; stem ascending, completely enclosed by imbricating leaf sheaths; leaves several, fleshy, arcuately spreading or drooping, narrowly oblong-elliptic to elliptic or obovate, at times oblanceolate, acute or obtuse, tapering to conduplicate base, articulate with leaf sheaths, up to 30 cm. long, to 9 cm. wide; inflorescence suberect, arching, at times pendulous, simple or branching, often producing keikis, much surpassing length of leaves; rachis distichous, somewhat fractiflex, several-flowered raceme; bracts distichous, ovate-triangular, persistent, concave, acute, to 5 mm. long; flowers fleshy, waxy, quite variable in size, to 6 cm. in diameter; dorsal sepal elliptic or oblong-elliptic, acute or obtuse, distinctly carinate dorsally, 22-30 mm. long; 10-14 mm. wide, rarely less; lateral sepals obliquely ovate-elliptic, canaliculate above, distinctly carinate dorsally, 20-30 mm. long, 10-14 mm. wide; petals from a cuneate base elliptic or ovate-elliptic, acute or obtuse, proportionally slightly smaller than sepals; lip 3-lobed, lateral lobes erect, quadrangular-oblong with truncate apex provided with a semi-lunate callus in middle; midlobe very variable in shape, linear-oblong, elliptic to ovate or oblong-ovate, fleshy, convex with elevated median longitudinal keel terminating in a swollen cushion-like elevation at apex, completely covered with rather coarse hairs, and decurrent in front; disc between lateral lobes papulose or fleshy, covered with many, often elongate antrorse papillae, in front of which a bifid acicular fleshy projection at the junction of midlobe and

PLATE 9

Phalaenopsis fimbriata var. *sumatrana.*

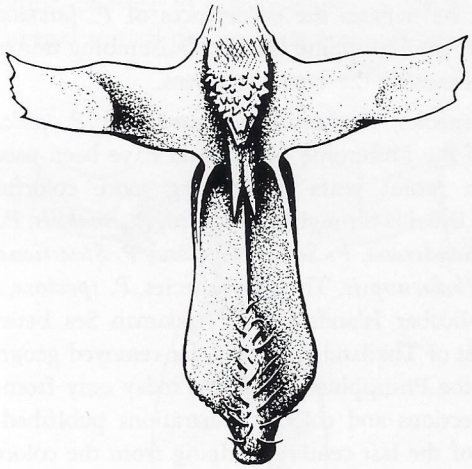
Phalaenopsis fimbriata.

Lip of *P. fimbriata.*

lateral lobes; length of whole lip 18-22 mm., 15-18 mm. across lateral lobes; column fleshy, cylindric, slightly arcuate, 10-12 mm. long; pedicellate ovary up to 3.5 cm. long. Chromosome no. $2n = 38$.

Distribution: Endemic in the Philippine Islands.

PHILIPPINES. Island unknown. Cult. Lueddemann s.n.! (W). Luzon Island. Manila. Coll. Wallis s.n.! (W); Coll. Quisumbing 76577! (AMES). Prov. Laguna. Coll. Curran 19272! (AMES); Coll. Taylor 211! (AMES); Apayo. Coll. Weber 346! (AMES); Irosin. Coll. Elmer 15768! (AMES, L); without precise locality. Coll. Loher 582! (K), 5386! (K). Prov. Tayabas. Coll. Ramos & Edaño 28551! (AMES); Coll. Ramos 19364! (AMES). Leyte Island. Coll. Danao 12452! (AMES). Also many living cultivated flowers have been studied.



Lip of *P. Lueddemanniana.* Drawn from type.

Illustrations: Cogn. & Goossens, Dict. Icon. Orch., Phalaenopsis, pl. 9, 1899; Lindenia 2: t. 94, 1886; Orch. Dig. 34:300, 1970; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 6, 1974.

Observations: This species was introduced from the Philippines by Low in England. It is interesting to note that some of the first plants were thought to be *Phalaenopsis equestris* and were thrown away before the error was caught. The species was named by Reichenbach in honor of M. Lueddemann of Paris, France, who was the first European to flower it in 1865. Actually it was flowered simultaneously in several collections and was given a First Class Certificate by the Royal Horticultural Society in May of the same year.

This species is variable not only in size, but also in coloration of the flowers. The flowers may be up to two inches across with a whitish ground color with magenta or amethyst-purple to reddish brown horizontal or transverse bars. The color is most prominent on front surface of the sepals and petals, while on the back surface there are only traces of the colored bars through the silvery white surface.

The lip is bright carmine with some yellow at the base and on the calli of the lateral lobes. The column is also purple with a greenish yellow anther. The illustration in the American Orchid Society Bulletin 35:16, 1966 labeled *P. Lueddemanniana* represents *P. pallens.*

Attention is called here to the treatment of this species by Quisumbing (Phil. Journ. Sci. 77:7, 1947). He confuses *Phalaenopsis Boxallii* with the yellow form, var. *ochracea,* of *P. Lueddemanniana.* However, an examination of the type indicates that *Phalaenopsis Boxallii* is identical with the well-known *P. Mannii* of the section *Polychilos.* Consequently, Quisumbing's conclusions are untenable. Moreover, an examination of Plates 1 and 3 in this same article (Phil. Journ. Sci. 77:7, 1947) reveals that under *P. Lueddemanniana* he has reported three entirely distinct species, as shown by the details of his drawings, i.e., the true *P. Lueddemanniana, P. fasciata* and *P. pallens* notwithstanding the fact that he negates the occurrences of *P. fasciata* and *P. pallens* in the Philippine Islands. Quisumbing unfortunately did not examine the type specimens.

Two species, *P. Lueddemanniana* and *P. pulchra,* are native to the Philippine Islands and have been used extensively in recent years in creating more colorful large-flowered hybrids through crosses with *P. amabilis, P. Aphrodite, P. Sanderana, P. Schillerana,* and *P. Stuartiana,* of the section *Phalaenopsis.* The third species, *P. speciosa,* a native of the Nicobar Islands in the Andaman Sea between the west coast of Thailand and India, far removed geographically from the Philippines, is known today only from herbarium collections and colored illustrations published toward the end of the last century. Judging from the colored illustration of such outstanding forms as *P. speciosa* var. *Imperatrix,* it would seem that its reintroduction could much enhance the current hybridizing programs. Even though the three species superficially are similar in their magenta-colored flowers, each can be readily identified when one examines the floral structures, especially the callosities on the lip, and the clinandrium of the column.

Among the outstanding color forms the following two have been recognized as distinct varieties:

Phalaenopsis Lueddemanniana var. **delicata** Rchb.f. in Gard. Chron. 434, 1865; Sweet in Amer. Orch. Soc. Bull. 38:39, 1969.

Syn.: *Phalaenopsis Lueddemanniana* subvar. *delicata* (Rchb.f.) Vietch, Man. Orch. Pl. pt. 7:30, 1891.

Type: Philippines. Introduced in 1865 and cultivated in Paris, France by M. Lueddemann s.n.! (W).

This variety may be differentiated from the common form in that the apical halves of the sepals and petals are marked with transverse bars of cinnamon or ochre color on a white ground, while the basal halves of the same floral segments are barred transversely with amethyst. The lip and base of the column are dark amethyst-purple. Structurally there is no deviation from the description given above for the species.

Distribution: Endemic in the Philippine Islands.

PHILIPPINES. Island unknown. Cult. Lueddemann s.n.! (W). Also living cultivated flowers have been studied.

Illustrations: Bot. Mag. 91: t. 5523, 1865; Orch. Digest 34:236, 1970. This illustration has been reproduced in various horticultural periodicals and magazines.

Phalaenopsis Lueddemanniana var. **ochracea** Rchb.f. in Gard. Chron. 434, 1865; Sweet in Amer. Orch. Soc. Bull. 38:39, 1969.

Syn.: *Phalaenopsis Lueddemanniana* subvar. *ochracea* (Rchb.f.) Veitch, Man. Orch. Pl. pt. 7:31, 1891.

Phalaenopsis ochracea (Rchb.f.) Carrière ex Stein, Orchideenbuch 509, 1892.

Type: Philippines. Introduced in 1865 and cultivated in Paris, France, by M. Lueddemann s.n.! (W).

Perhaps this is one of the most misapplied names in the *P. Lueddemanniana* complex. The flowers are identical in shape and size with the typical amethyst-purple type. Instead of this color the transverse bars or stripes on the sepals and petals are of an ochre color on an almost white to light yellowish ground color. The basal parts of the sepals and petals are suffused with pale amethyst-purple. The midlobe of the lip is unicolored — amethyst-purple of varying intensity. Chromosome no. $2n = 38$.

Many of the plants in cultivation called by this varietal name are referable to *P. fasciata.* See above.

Distribution: Philippine Islands.

PHILIPPINES. Island unknown. Cult. Lueddemann s.n.! (W). Leyte Island. Dagami. Coll. Wenzel 54! (AMES). Also living cultivated flowers have been studied.

Illustrations: Rev. Hort. 44:390, t., f. A., 1872; Orch. Digest 34:302, 1970. The photograph reproduced in Amer. Orch. Soc. Bull. 34:217, 1965 is incorrectly identified and represents *P. fasciata.*

Observations: On several occasions I have studied living flowers of a plant awarded a Certificate of Botanical Merit by the judges of the American Orchid Society in 1963 under the name of *Phalaenopsis Mariae* var. *alba* 'Crestwood.' In each instance the flower showed consistently the characteristics described for *Phalaenopsis Lueddemanniana* var. *ochracea.* It so happens that this particular clone produces flowers so pale that the ochre barring can be seen only by transmitted light. Therefore, the clonal name 'Crestwood' should, in this case, be attached to *Phalaenopsis Lueddemanniana* var. *ochracea.*

EXCLUDED VARIETIES

P. Lueddemanniana var. *Boxalli* Hort. ex Vaughn in Amer. Orch. Soc. Bull. 31:796, 1962. *Nomen.*

P. Lueddemanniana var. *fasciata* Hort. ex Thornton in Amer. Orch. Soc. Bull. 34:218, 1965. *Nomen.*

P. Lueddemanniana var. *hieroglyphica* Rchb.f. in Gard. Chron. ser. 3, 2:586, 1887. See *P. hieroglyphica* (Rchb.f.) Sweet.

P. Lueddemanniana var. *palawanensis* Quisumbing in Phil. Orch. Rev. 5, no. 3:2, t. 1953. See *P. hieroglyphica* (Rchb.f.) Sweet.

P. Lueddemanniana var. *pallens* Burb. in Garden 22:119, 1882. See *P. pallens* (Lindl.) Rchb.f.

P. Lueddemanniana var. *pulchra* Rchb.f. in Gard. Chron. n.s. 4:36, 1875. See *P. pulchra* (Rchb.f.) Sweet.

P. Lueddemanniana var. *purpurea* Ames & Quisumbing in Phil. Jour. Sci. 49:494, 1932. See *P. pulchra* (Rchb.f.) Sweet.

P. Lueddemanniana var. *surigadensis* Hort. in Amer. Orch. Soc. Bull. 34:542, 1965. *Nomen.*

P. Lueddemanniana var. *Wardii* Hort. ex E. Corning, Catalogue of Orchids, 29, 1881. *Nomen.*

PRIMARY CROSSES

Phalaenopsis Lueddemanniana Rchb.f.

× *P. amabilis* = *P.* × John Seden. 1888 (Veitch)

Syn.: *P.* × *Sedeni* Rolfe. 1888

P. × Star of Malaysia. 1968 (Burgeff)

× *P. amboinensis* = *P.* × *Ambomanniana.* 1965 (Thornton)

× *P. Aphrodite* = *P.* × Pierrot. 1961 (Miller)

× *P. cornu-cervi* = *P.* × El Tigre. 1964 (Miller)

× *P. equestris* = *P.* × Mahinhin. 1957 (Miller)

× *P. fasciata* = *P.* × Spica. 1969 (Osgood: Kuhn)

Syn.: *P.* × Yardstick. 1969 (Beard)

× *P. fuscata* = *P.* × *Lucata.* 1967 (Thornton)

× *P. gigantea* = *P.* × Joey. 1973 (Fort Caroline Orchids: Wallbrunn)

× *P. Lindenii* = *P.* × Sunfire. 1964 (Miller)

× *P. Mannii* = *P.* × Hymen. 1900 (Veitch)

× *P. Mariae* = *P.* × Tigerette. 1974 (Hausermann)

× *P. Parishii* = *P.* × Minuet. 1976 (Wallbrunn)

× *P. Sanderana* = *P.* × Mrs. J. H. Veitch. 1899 (Veitch)

Syn.: *P.* × Luzon. 1958 (Rivermont Orchids)

× *P. Schillerana* = *P.* × Regnier. 1922 (Regnier)

× *P. Stuartiana* = *P.* × Hermione. 1899 (Veitch)

× *P. sumatrana* = *P.* × Elizabeth Todd. 1970 (Fort Caroline Orchids)

× *P. violacea* = *P.* × *Luedde-violacea.* 1895 (Veitch)

× *Doritis pulcherrima* = × *Doritaenopsis* Sweet Gem. 1970 (Hiew's)

Unfortunately the International Registration Authority for Orchid Hybrids of the Royal Horticultural Society, London, England, no longer recognizes for registration purposes *Phalaenopsis hieroglyphica, P. pallens* and *P. pulchra* as species distinct from *P. Lueddemanniana.* This simplistic approach raises havoc with the scientific nomenclature as well as producing a situation in which highly heterogenous and different hybrids must be called by names which do not reflect their true parentage and genealogy.

Phalaenopsis violacea Witte in Ann. Hort. Bot. Leiden 4:129; t., 1860; Sweet in Amer. Orch. Soc. Bull. 38:40, 1969.

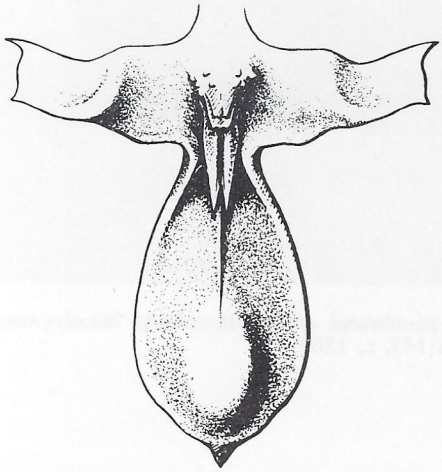
Type: Sumatra: Palembang. Coll. Teijsmann s.n. Cult. in Bogor and Leiden. Icon. Witte! (L).

Syn.: *Stauritis violacea* Rchb.f. in Hamburg. Gartenz. 18:34, 1862.

Stauropsis violacea Rchb.f., Xenia Orch. 2:7, 1862.

Type: Sumatra. Introduced and flowered by Willink s.n.! (W).

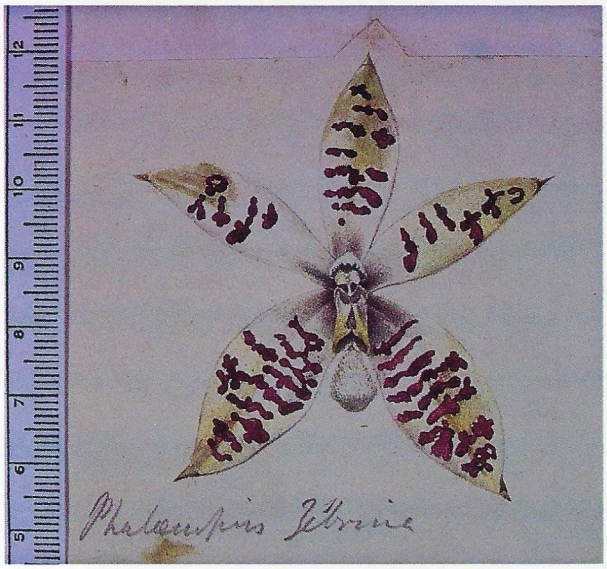
Epiphytic; roots heavy, flexuous, glabrous; stem erect or ascending, strong, well-developed, completely enclosed by distichously imbricating leaf sheaths; leaves fleshy or leathery, elliptic, obovate to oblong-elliptic, acute or obtuse at apex, tapered toward conduplicate base, articulate with leaf



Lip of *P. violacea.* Drawn from type of *Stauritis violacea.*

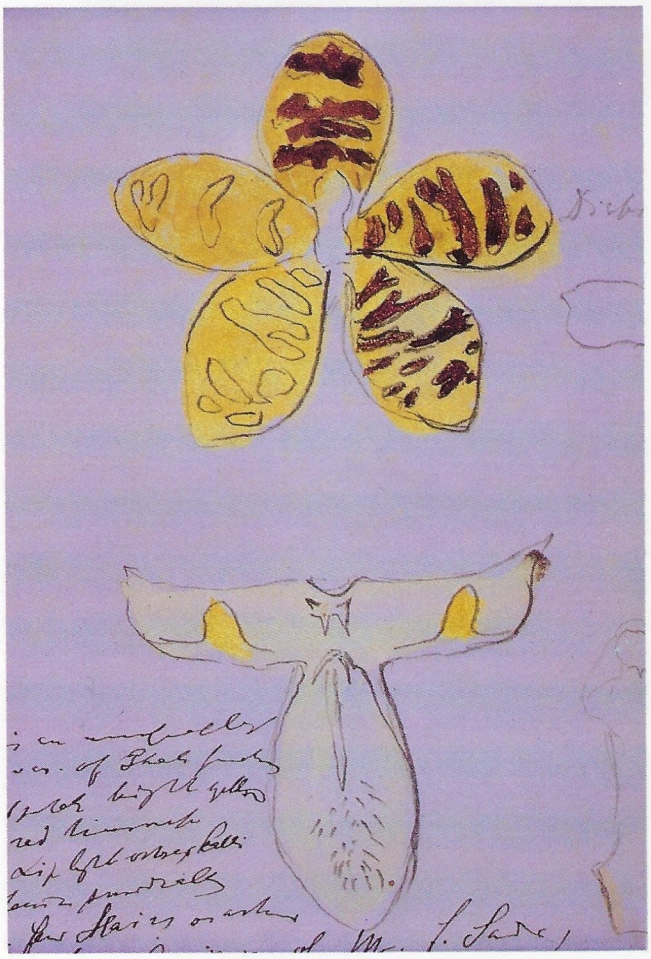
sheaths, variable in size, usually from 20-25 cm. long, 7-12 cm. wide, rarely larger; inflorescence robust, suberect or arcuate with prominently fractiflex rachis, remotely few-flowered; bracts ovate-cucullate, acute, to 7 mm. long; flowers fleshy, waxy; dorsal sepal oblong-elliptic or elliptic to ovate or ovate-lanceolate, somewhat concave, prominently carinate dorsally, 20-35 mm. long, 8-15 mm. wide; lateral sepals obliquely adnate to base of column, ovate-lanceolate, subfalcate above with a conduplicate apex, prominently carinate dorsally, 22-35 mm. long, 11-17 mm. wide; petals elliptic or ovate-elliptic with an asymmetrical base, acute to subobtuse at apex, 20-30 mm. long, 7-17 mm. wide; lip 3-lobed, lateral lobes erect, linear-oblong, truncate at apex with a semilunate thickening in middle; midlobe ovate, apiculate, fleshy, convex with a median lamellate keel tapering into an ovoid thickening or callus just below apex, completely glabrous, very rarely with a few warts on apical callus; disc between lateral lobes of lip pulvinately incras-

Phalaenopsis sumatrana, type of *P. zebrina* Witte. (Ann. Hort. Bot. Leiden 4:145, t., 1860).



Copy of Teijsmann's original watercolor of *P. zebrina.*

Phalaenopsis sumatrana.

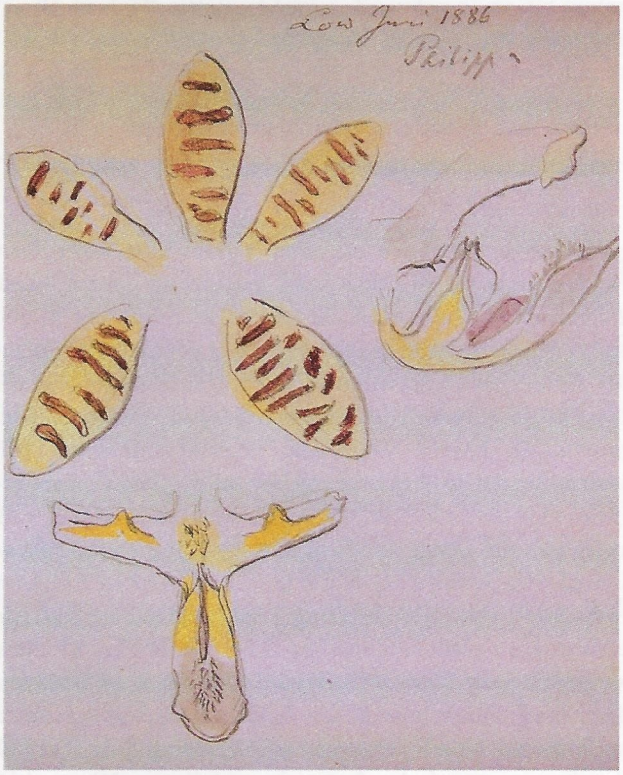


Phalaenopsis sumatrana var. *Kimballiana.* Copy of original watercolor by Reichenbach.

Phalaenopsis fasciata.

Phalaenopsis fasciata.

Copy of original watercolor of *P. fasciata* by Reichenbach.



Copy of original watercolor of *P. Reichenbachiana* by Reichenbach.

Phalaenopsis pulchra.

sate, papillous in front, merging into 1 to 3 superimposed, often divided, fleshy lamellae; at junction of midlobe and lateral lobes provided with an elevated bifid fleshy projection prominently grooved in center; length of whole lip 20-28 mm., width across lateral lobes 16-23 mm.; column fleshy, slightly arcuate, cylindric, dilated toward base, up to 15 mm. long; pedicellate ovary 3 cm. long; capsule to 15 cm. long. Chromosome no. $2n = 38$.

Distribution: Sumatra, Mentawai, Simeuluë. Borneo. Malaya: Perak, Selangor, Malacca.

MALAY PENINSULA. Malacca. Cult. Low 13! (W), 14! (W). Perak State. Coll. Scortechini s.n.! (CAL,K). SUMATRA. Palembang. Coll. Teijsmann s.n.! (L); Cult. in Bogor and Leiden. Icon. Witte. Coll. Teijsmann s.n.! (L,W). BORNEO. Coll. Boxall s.n.! (W). ORIGIN UNKNOWN. Cult. Wigan s.n.! (AMES); Cult. Bull. 152! (W); Cult. Sander s.n.! (W). Also many living cultivated flowers have been studied.

Illustrations: Orchid Dig. 36:12, 1972; Katoh & Futakuchi, Orchids in Colour, pl. 114, figs. 1 and 2, 1974.

Observations: The history of the type is quite involved. *Phalaenopsis violacea* was first discovered in Sumatra by Teijsmann, who, in 1859, sent living plants to the Botanic Garden at Leiden, Netherlands, where it was flowered for the first time in Europe by Witte. In the same year Willink in Amsterdam also received some plants of this species. Witte described and illustrated in color his plant in the Annales d'Horticulture et de Botanique ou Flore des Jardins du Royaume des Pays-Bas 4:129, 1960. Willink, however, sent his flowering material to Reichenbach who independently described it as a new species in 1862, naming it *Stauritis violacea,* intending it for the genus *Stauropsis* (see Xenia Orch. 2:7, 1862). In the meantime Teijsmann, jointly with Binnedijk in Bogor, described the same collection as a new species in 1862, calling it *Phalaenopsis violacea.* That we are dealing with one and the same taxon is evident from an examination of Witte's plate of *Phalaenopsis violacea,* of Reichenbach's material of *Stauritis violacea* and of the colored drawing of Binnedijk of *Phalaenopsis violacea* sent to Hooker at the Royal Botanic Garden at Kew, England, May 1, 1861, prior to its publication. While the historical background is somewhat involved, its correct name is clearly established by the rule of priority. Hence, it must be called *Phalaenopsis violacea* Witte.

The plants when well grown, may have leaves up to two feet long. Such plants when not in flower have been purchased by orchidophiles in the past, believing them to be *P. gigantea,* only to be disillusioned when the plants flowered. However, the leaves of *P. violacea* have a sheen which distinguishes this species when not in flower from *P. gigantea.*

The flowers, up to three inches across, have been described by such color names as carnation, purple, magenta, rosy magenta and rose-carmine. The tips of the sepals and petals usually are green. The midlobe of the lip and the column are also a bright magenta or rose-carmine. The plants which produce flowers of a rather uniform magenta or rose-carmine are from the Malayan peninsula (Perak, Selangor, and Malacca), Sumatra, and Simeuluë and Mentawei Islands off the coast of Sumatra and are today referred to as the Malayan type or strain. Those from Borneo display more of a marked variation in color pattern and have come to be known as the Bornean type. These latter flowers usually have white or ivory sepals and petals with a greenish suffusion and with the apical third an apple-green color and a bright magenta blotch of varying size on or at times the entire inner half of the lateral sepals. The column and midlobe of the tip are also magenta.

Phalaenopsis violacea has been widely used in breeding programs both within the genus and with species belonging to related genera, not only because of its color, but also because of its extremely heavy substance.

As records show, the plants collected in Borneo display marked variations in color pattern, many of which have been given named varietal status. Because they are of horticultural importance, they are listed here, each separately notwithstanding the lack of morphological differentiation. There are several unnamed color variations known to me from drawings preserved in the Central National Herbarium, Calcutta, India. However, due to lack of voucher specimens I refrain from describing them.

Phalaenopsis violacea var. **alba** Teijs. & Binn. in Natuurk. Tijdschr. Nederl. Indië 24:320, 1862; Sweet in Amer. Orch. Soc. Bull. 38:42, 1969.

Syn.: *Phalaenopsis violacea* subvar. *alba* (Teijs. & Binn.) Veitch, Man. Orch. Pl. pt. 7:42, 1891.

Type: Sumatra: Palembang. Coll. Teijsmann s.n.

Sepals and petals white with greenish tips.

Distribution: Sumatra. Palembang.

Illustration: Amer. Orch. Soc. Bull. 34:206, 1965.

Phalaenopsis violacea var. *alba* is rare. This white form was first reported in 1862 from Palembang on the island of Sumatra by Teijsmann. Several other references to this variety occur in the literature. There is a watercolor in the Day Collection of drawings at the Royal Botanic Gardens, Kew, England, which was sent to Messrs. Veitch & Sons from a Mr. Lea of Worcester, England and which was eventually sent to Reichenbach for study. The flowers are white with the apices of the sepals and petals tipped with green and the lateral lobes of the lip tinged with yellow. A semi-transparent waxy white flower was reported in Lord Rothschild's collection at Tring Park, England in 1897. In recent times a plant exhibited by Alberts & Merkel Brothers, Boynton Beach, Florida received a Certificate of Botanical Merit from the judges of the American Orchid Society at the Regional Monthly Judging in Miami on July 8, 1964. The description of the flower is as follows: "One white

flower tinged with green; lip white with yellow lobes. Natural spread of flower 1¾". . . ." Unfortunately this particular plant met an early demise according to Norman Merkel, for the plant was inadvertently left in his car after the judging in front of a window in direct sunshine and was fatally burned.

Phalaenopsis violacea var. **bellina** Rchb.f. in Gard. Chron. n.s. 22:262, 1884; Sweet in Amer. Orch. Soc. Bull. 38:42, 1969.

Type: Origin unknown. Cultivated in 1878 by Williams s.n.! (W).

Syn.: *Phalaenopsis violacea* var. *chloracea* Rchb.f. in Gard. Chron. n.s. 22:262, 1884.

Type: Origin unknown. Cultivated in 1882 by Veitch s.n.! (W).

Sepals and petals white with apical third of an apple-green color, turning yellow throughout with age; magenta blotch on inner half of the lateral sepals. The tip of the column and midlobe of lip is also magenta. Lateral lobes of lip are yellow with two magenta spots on each.

Illustration: Lindenia 7: t. 303, 1891.

Observations: Judging from the record in the Reichenbach Herbarium, the watercolor of *P. violacea* var. *bellina* was prepared in 1878, while the *P. violacea* var. *chloracea* was done in 1882. It was not until 1884 that Reichenbach published both of these varietal names simultaneously. It is evident that he was not aware of the fact that these two color forms represent merely aging phases of one and the same flower. It is rather unfortunate that *P. violacea* var. *bellina* has been applied to the color phase of an old flower, long past its prime, yet because of priority this name prevails. I myself have observed the transition in ground color from the "chloracea" phase to the "bellina" phase.

Phalaenopsis violacea var. **Bowringiana** Rchb.f. in Gard. Chron. n.s. 22:262, 1884; Sweet in Amer. Orch. Soc. Bull. 38:42, 1969.

Type: Origin unknown. Cultivated in 1878 by Williams s.n.! (W).

Sepals and petals "light yellow with a very broad dash inside each of the lateral sepals, and some fine bands and numerous freckles of the same colour at the base of the petals and the base of the upper sepal."

Phalaenopsis violacea var. **Murtoniana** Rchb.f. in Gard. Chron. n.s. 10:234, 1878; Sweet in Amer. Orch. Soc. Bull. 38:43, 1969.

Type: Origin unknown. Cultivated in 1878 by Williams s.n.! (W).

Sepals and petals light lemon-yellow with magenta-purple extending to tips on inside half of the lateral sepals. Midlobe of lip and column also magenta-purple. Lateral lobes of lip orange-yellow with purplish tips.

Distribution: Origin unknown. Cult. Williams s.n.! (W).

MALAY PENINSULA. South Perak, Changkat. Coll. Kloss 6514! (K); Kinta. Coll. Murton s.n. (SING); Bidor. Coll. Curtis s.n. (SING).

Illustration: Warner & Williams, Orchid Album 4: t. 182, 1885.

Observations: *Phalaenopsis violacea* var. *Murtoniana,* one of the Bornean strains, is reported from Perak, but Murton apparently received his specimen from Singapore. It is known that much of the Singapore material was introduced from Borneo.

Phalaenopsis violacea var. **punctata** Rchb.f. in Gard. Chron. n.s. 22:262, 1884; Sweet in Amer. Orch. Soc. Bull. 38:43, 1969.

Type: Without country of origin or collector. Reichenbach Herb. Icon. 22288! (W).

This is an unusual variety having white sepals and petals with the apical third greenish yellow. On the lateral sepals in lieu of the large purple blotches there are numerous small scattered purple dots. The apical portion of the midlobe of the lip, the base of the column, and the anther are rich purple. The lateral lobes and margin of midlobe of the lip are pale yellow.

PRIMARY CROSSES

Phalaenopsis violacea Witte

× *P. amabilis* = *P.* × *Harriettae.* 1887 (Veitch)
× *P. amboinensis* = *P.* × Princess Kaiulani. 1961 (Kirsch)
× *P. cochlearis* = *P.* × Little Darlin'. 1969 (Jones & Scully)
× *P. Corningiana* = *P.* × Corning's Violet. 1976 (Sheviak)
× *P. cornu-cervi* = *P.* × *Valentinii* Rchb.f. 1883
× *P. equestris* = *P.* × *Equalacea.* 1967 (Thornton)
× *P. fasciata* = *P.* × Norman. 1969 (Beard)
× *P. fimbriata* = *P.* × Java. 1970 (Thornton)
× *P. gigantea* = *P.* × Mok Choi Yew. 1968 (Mok)
× *P. Lindenii* = *P.* × Vilind. 1969 (Kirch)
× *P. Lueddemanniana* = *P.* × *Luedde-violacea.* 1895 (Veitch)
× *P. maculata* = *P.* × Spring Rain. 1974 (Hager)
× *P. Mannii* = *P.* × *Malacea.* 1970 (Thornton)
× *P. Mariae* = *P.* × Violet Charm. 1971 (Freed)
× *P. Sanderana* = *P.* × Hans Burgeff. 1960 (Ceylon Bot. Gard.)
× *P. Stuartiana* = *P.* × *punctatissima* Guillaum. 1929
× *P. sumatrana* = *P.* × *singuliflora* J. J. Smith. 1932 (Nat. Hybr.)
× *P. sumatrana* = *P.* × Sulaceous. 1975 (Fort Caroline Orchids: Wallbrunn)

Phalaenopsis hieroglyphica.

Phalaenopsis hieroglyphica.

Phalaenopsis Lueddemanniana 'Woodlawn'.

Phalaenopsis Lueddemanniana.

Phalaenopsis Lueddemanniana var. *delicata.*

Phalaenopsis Lueddemanniana var. *ochracea.*

Phalaenopsis Lueddemanniana var. *ochracea* 'Greenfinch'.

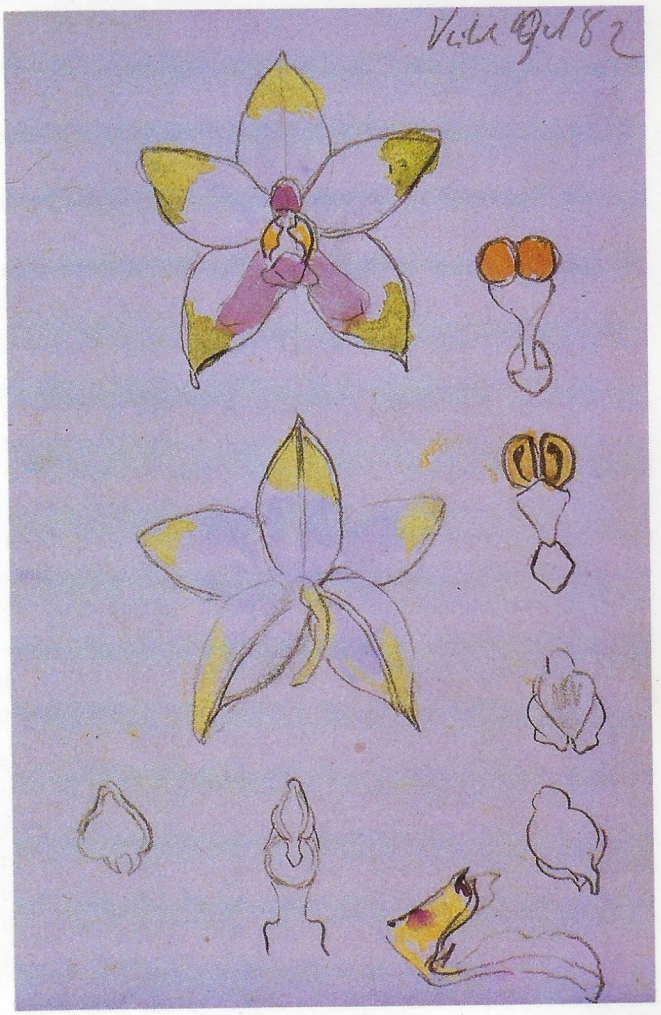
Phalaenopsis Lueddemanniana 'Quezon'.

Copy of original watercolor by Teijsmann & Binnendijk of *P. violacea.*

Phalaenopsis violacea (Malayan form).

Phalaenopsis violacea var. *alba.*

Phalaenopsis violacea var. *Murtoniana* (Bornean form). Warn. & Wms., Orchid Album, vol. 4, t. 182, 1885.



Phalaenopsis violacea var. *chloracea.* A copy of Reichenbach's original watercolor.

× *Arachnis Hookerana* = × *Arachnopsis* Khalsom. 1961 (Kuok: Singapore Bot. Gard.)

× *Doritis pulcherrima* = × *Doritaenopsis* Kenneth Schubert. 1963 (Clarelen Orchids)

☆ ☆ ☆

Subsection HIRSUTAE Sweet in Amer. Orchid. Soc. Bull. 37:874, 1968; *ibid.* 38:225, 1969.

Column with a non-developed, low, marginate, entire clinandrium or anther bed; disc between the lateral lobes of the lip with single, bifid callus; midlobe of lip fleshy, convex, incrassate toward the apex and covered with hairs.

Type: *Trichoglottis pallens* Lindl. = *Phalaenopsis pallens* (Lindl.) Rchb.f.

ENUMERATION OF SPECIES

Phalaenopsis pallens (Lindl.) Rchb.f. in Walp. Ann. 6: 932, 1864; Sweet in Amer. Orch. Soc. Bull. 38:225, 1969.

Basionym: *Trichoglottis pallens* Lindl. in Jour. Hort. Soc. 5:34, 1850.

Syn.: *Stauropsis pallens* Rchb.f. in Hamb. Gartenz. 16: 117, 1860.

Phalaenopsis Lueddemanniana var. *pallens* Burb. in The Garden 22:119, 1882.

Type: Philippine Islands, without precise locality. Cult. Duke of Devonshire s.n.! (K).

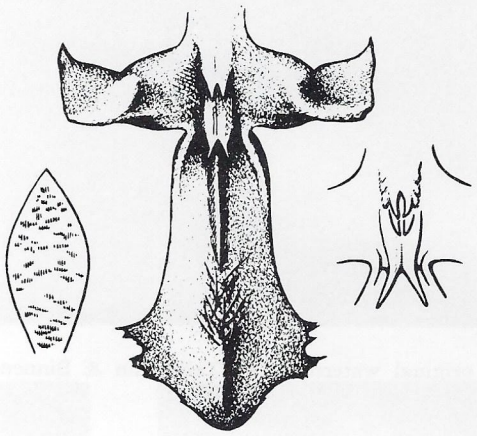
Phalaenopsis Foerstermanii Rchb.f. in Gard. Chron. ser. 3, 1:244, 1887.

Type: Country of origin unknown. Coll. Foersterman s.n.! Cult. Sander. (K).

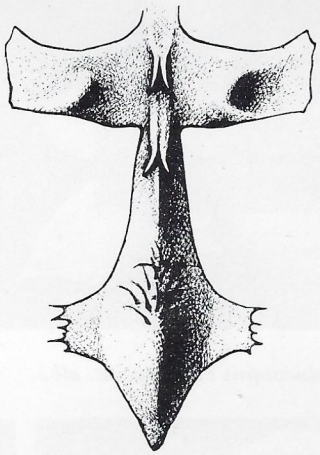
Plants epiphytic; roots many, fleshy, flexuous, glabrous; stem rhizomatous, ascending, short and enclosed by distichous leaf-bases; leaves fleshy, pendulous, elliptic to obovate, rounded or obtuse above, often unequally bilobed, cuneate below, 12-18 cm. long, 4.5-6 cm. wide; inflorescence rather slender, length rarely exceeding the subtending leaves; racemose above; rachis fractiflex, one- to few-flowered; bracts triangular-ovate, concave, acute to 4 mm. long; flowers rather delicate in texture; sepals and petals spreading; dorsal sepal oblong-elliptic, acute or obtuse, dorsally mucronate, 12-23 mm. long, 5-10 mm. wide; lateral sepals similar to dorsal sepal, oblique, acute or obtuse, dorsally mucronate, 15-22 mm. long, 8-10 mm. wide; petals similar to lateral sepals in shape, somewhat smaller, 11-20 mm. long, 5-9 mm. wide; lip 3-lobed, lateral lobes oblong-ligulate, truncate with semilunate callus in middle; midlobe from a cuneate base, ovate, obtuse, laterally toward apex irregularly dentate, disc with a median elevated lamella-like keel from base to middle, in front of which with a tuft of hairs terminated at apex by an elevated fleshy glabrous callus; disc between lobes with a pair of superimposed bifid fleshy calli, the anterior one situated at the junction of the midlobe and lateral lobes; length of whole lip 13-17 mm., width across lateral lobes 12-14 mm.; column slightly arcuate; fleshy, dilated toward base, 8 mm. long; pedicellate ovary 2 cm. long.

Distribution: Philippine Islands.

PHILIPPINE ISLANDS: Luzon Island. Manila. Collector unknown. Cult. Duke of Devonshire s.n.! (K); Coll. Ramos 3069! (AMES); Coll. Quisumbing 503! (AMES,PNH);



Dorsal sepal and lip of *P. pallens*. Drawn from type.



Lip of *P. pallens* var. *trullifera*.

Coll. Lyon 48! (AMES). Prov. Nueva Viscaya, Dupax. Coll. McGregor 11136! (AMES,K), 11141! (AMES,K). Prov. Rizal. Coll. Loher 14650! (AMES). Prov. Bulacán, Norzagaray. Coll. Ramos 13046! (AMES). Palawan Island, Puerto Princesa. Coll. Elmer 13043! (AMES). ORIGIN UNKNOWN. Coll. Foersterman s.n.! (W). Also living cultivated flowers have been studied.

Illustrations: Orch. Dig. 34:302, 1970; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 10, 1974.

Observations: Some confusion still seems to persist among orchidophiles regarding the correct identity or rather the method by which the Philippine yellow-flowered species of the section *Zebrinae* may be differentiated from one an-

other: *Phalaenopsis pallens, P. fasciata, P. Lueddemanniana* var. *ochracea* and *P. Reichenbachiana.* All four species appear to be similar in color and markings to the untrained eye. Since some of these have been used extensively in crosses with *P. amabilis, P. Aphrodite, P. Sanderana, P. Schillerana* and *P. Stuartiana* to obtain large yellow- to salmon-colored flowers, it is most important that their correct names be fully understood.

The identity of *Phalaenopsis pallens,* as so many orchids of cultivated origin, had a rugged past. It was first described by Lindley as *Trichoglottis pallens* from a poorly flowered plant grown by the Duke of Devonshire in 1849. Reichenbach in 1864 recognizing Lindley's mistake correctly transferred it to the genus *Phalaenopsis.* Reichenbach's transfer apparently at that time left no impression on the horticultural concerns for no live plants of *P. pallens* existed then. No more was heard or known about it until 1887, when it reappeared briefly under the name of *Phalaenopsis Foerstermanii* from material collected by Foersterman in the Philippines and flowered by Sander. Later a plant of this species was received at Kew from the Calcutta Botanic Garden mislabeled *P. cornu-cervi.* Based on this mislabeled plant Rolfe questioned the Philippine origin of *P. pallens,* an action quite unwarranted in the light of our present knowledge. Today *P. pallens* is one of the most common yellow-flowered Philippine species in cultivation in the United States. It has been given various incorrect and unpublished names such as *P. Lueddemanniana* var. *fasciata, P. Lueddemanniana* var. *Boxallii,* and *P. Lueddemanniana* var. *pallens,* not to mention *P. cornu-cervi* and *P. Mannii.* The latter two species, however, belong to a widely separated section of the genus characterized by an anchor-shaped apex to the midlobe of the lip.

This species has been a puzzle concerning its country of origin. Rolfe questioned the Philippine (Manila) origin, because no other plants had been found since the original introduction. Although this may seem to be sufficient basis for questioning, I have found in the collections of the Orchid Herbarium of Oakes Ames several sheets referable to this species which had been misidentified and confused with the yellow forms of *P. Lueddemanniana.* As a matter of fact, this species is quite common in the United States, but under incorrect names, mostly as *P. Lueddemanniana.* It has already been pointed out that illustrations in the American Orchid Society Bulletin 35:16, 1966 labeled *P. Lueddemanniana* as well as *ibid.* 34:217, 1965 (right) called *P. Lueddemanniana* var. *fasciata* represent *P. pallens.* Notwithstanding the general confusion that exists between *P. pallens* and the yellow form of *P. Lueddemanniana,* a comparison of the shape of the lip, especially the callosities between the lateral lobes, readily distinguishes the two from one another.

The salient features by which this species may be recognized are the markings on the sepals and petals and the morphological details of the lip. The flowers of *P. pallens* vary from a very light lemon-yellow or greenish yellow to a corn-yellow. The sepals and petals are rather delicate and characteristically marked with brown to reddish brown or cinnamon-colored, short, thin, transverse lines and dashes. The lip is white with orange-yellow to yellow calli on the lateral lobes. Special attention is called to the ink drawing of the lip showing the characteristic fleshy bifid calli between the lateral lobes and an irregularly dentate midlobe with a cushion-like callus near its apex bearing tufts of hairs.

Lindley in Jour. Hort. Soc. London 5:34, 1850 offers the following description: ". . . a dwarf erect plant, with oblong distichous leaves, and a lateral flower or two, not quite 2 inches in diameter, pale yellowish green, with delicate brown spots and a white lip. The latter organ was oblong; with a white, shaggy crest on the upper side, and a pair of short, yellowish scimitar-shaped segments standing erect near the base; within these were a pair of forked callosities, one placed before the other in the centre, but no sac or pouch was found between them."

Reichenbach describes the flowers with a white ground color and the sepals and petals with brown transverse lines, now and then forked.

Unfortunately the International Registration Authority for Orchid Hybrids of the Royal Horticultural Society, London, England, no longer recognizes for registration purposes *Phalaenopsis pallens* as a species distinct from *P. Lueddemanniana.* This simplistic approach raises havoc with the scientific nomenclature as well as producing a situation in which highly heterogenous and different hybrids must be called by names which do not reflect their true parentage and genealogy.

Among the variations, the following may be recognized:

Phalaenopsis pallens var. **alba** (Ames & Quis.) Sweet in Amer. Orch. Soc. Bull. 38:226, 1969.

Basionym: *Phalaenopsis Mariae* var. *alba* Ames & Quis. in Phil. Jour. Sci. 56:461, pl. 2, figs. 3, 4; pl. 4, figs. 9-17, 1935.

Type: Philippine Islands: Mindanao on hill of Bukidnon. Coll. Phillips s.n. (PNH).

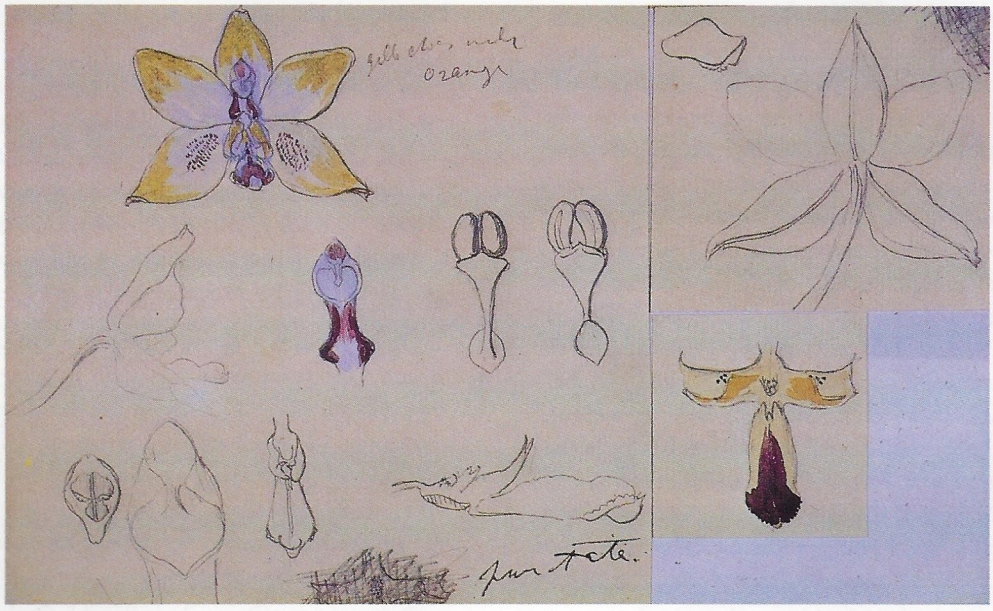
This variety differs from the normal form in the absence of any pronounced markings on the sepals and petals.

Observations: When Ames and Quisumbing noted this albino form, they were mistaken in assigning the specimen they examined to *P. Mariae.* In the description they compare only the midlobe of the lip of this variety with the midlobe of *P. Mariae,* as illustrated in Bot. Mag. 113; t. 6964, 1887. However, neither the shape of the flowers nor the callosities between the lateral lobes of the lip are identical in these two species.

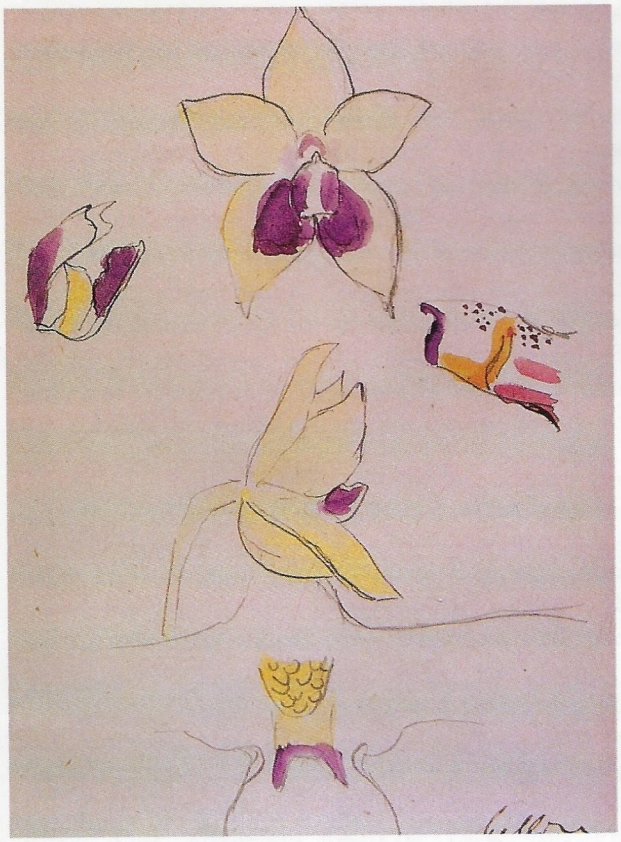
Quisumbing (Proc. 2nd World Orch. Conf. 29, 1957) states that all of his Phalaenopsis ". . . studies were based on living specimens, and not on mummified herbarium

Phalaenopsis violacea var. *Murtoniana* 'Country Acres'.

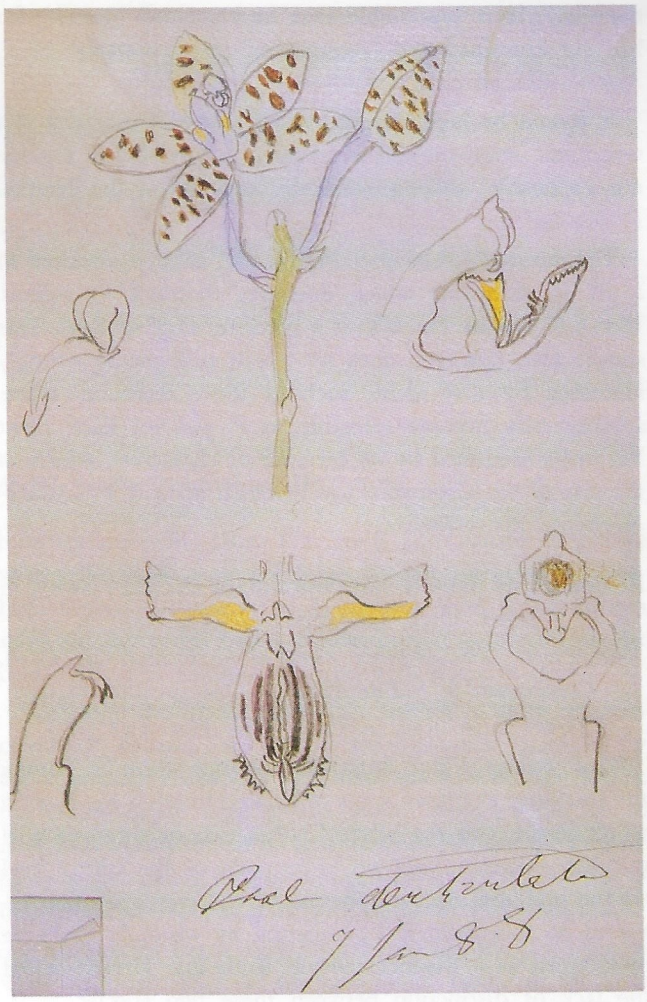
Phalaenopsis violacea var. *Bowringiana.* Copy of original watercolor by Reichenbach.



Phalaenopsis violacea var. *punctata.* A copy of original watercolor by Reichenbach.



Phalaenopsis violacea var. *bellina.* Copy of original watercolor by Reichenbach.



Phalaenopsis pallens var. *denticulata.* Copy of original watercolor by Reichenbach.

Phalaenopsis pallens.

Lip of *P. pallens.*

material." It is regrettable that he restricted himself, for had he examined the "mummified" type material of *P. Mariae* such an error would have been avoided.

It should be kept in mind that *P. Mariae* var. *alba* is a taxonomic synonym and consequently it is neither eligible nor applicable in designating albino forms of the genuine *P. Mariae.*

The name, *Phalaenopsis Mariae* var. *alba,* is attached to a set of characters which duplicate those of *P. pallens.* Hence *P. Mariae* var. *alba* is a synonym of *P. pallens.* This simple fact, however, does not mean that plants wrongly identified by that name, such as the 'Crestwood' clone, automatically become referable to *P. pallens.* Each plant has to be identified by its own set of characters, which in the case of the 'Crestwood' clone match up with *P. Lueddemanniana* var. *ochracea.*

Phalaenopsis pallens var. **denticulata** (Rchb.f.) Sweet in Amer. Orch. Soc. Bull. 38:227, 1969.

Basionym: *Phalaenopsis denticulata* Rchb.f. in Gard. Chron. ser. 3, 3:296, 1888.

Type: Introduced in 1887. Cult. Low s.n.! (W).

This variety differs from the common form in having the markings as brown spots or broken lines on the creamy white sepals, and the white lip has two or three parallel purplish magenta lines on either side of the center keel on the midlobe. An examination of the type specimen revealed no morphological distinction by which it could be maintained as a distinct species. Rolfe has already noted the lack of distinction between these two species.

Distribution: Philippine Islands.

Phalaenopsis pallens var. ***trullifera*** Sweet in Amer. Orch. Soc. Bull. 38:227, 1969.

Type: Philippine Islands. Luzon Island, Prov. Bataan, Mt. Mariveles, Lanao River. Coll. Whitford 1097! (AMES).

This differs from the general form in having larger floral segments and a distinct trowel-shaped midlobe to the lip.

Plants delicate, leaves to 17 cm. long, 4 cm. wide; inflorescence slender, arcuate, occasionally branching, commonly shorter than subtending leaves; floral segments spreading, dorsal sepal 25 mm. long, 10 mm. wide; lateral sepals 27 mm. long, 10 mm. wide; petals 22 mm. long, 8 mm. wide; lip fleshy, 3-lobed; lateral lobes oblong-ligulate, truncate with fleshy callus in center; midlobe from cuneate base, gradually dilates into a trowel shape, pointed in front and irregularly denticulate on both sides at angle of trowel, the disc from base to middle provided with fleshy keel in front of which a large laterally compressed, elevated fleshy callus tapering to the tip; the inner base of callus toward keel is covered with fleshy stiff hairs; the disc between lateral lobes of lip with a pair of superimposed fleshy bifid calli, the anterior one at the junction of midlobe and lateral lobes; length of whole lip 16 mm.; width across lateral lobes 12 mm.; column fleshy as in the species; pedicellate ovary 3.5 cm. long.

Observations: This variety has been confused in the herbarium with *P. Micholitzii* and *P. Lueddemanniana.* However, it bears no resemblance to either of them. The distinction noted in the form of the midlobe shows considerable deviation of the basic pattern of *P. pallens.*

However, the general aspect of the flower and the arrangement of the callosities on the lip as well as the shape of the column, definitely indicate that it is part of the variation pattern of *P. pallens.* The description and illustration are prepared from the herbarium specimen.

PRIMARY CROSSES

Phalaenopsis pallens (Lindl.) Rchb.f.

× *P. Schillerana* = *P.* × Tigre. 1922 (Regnier)

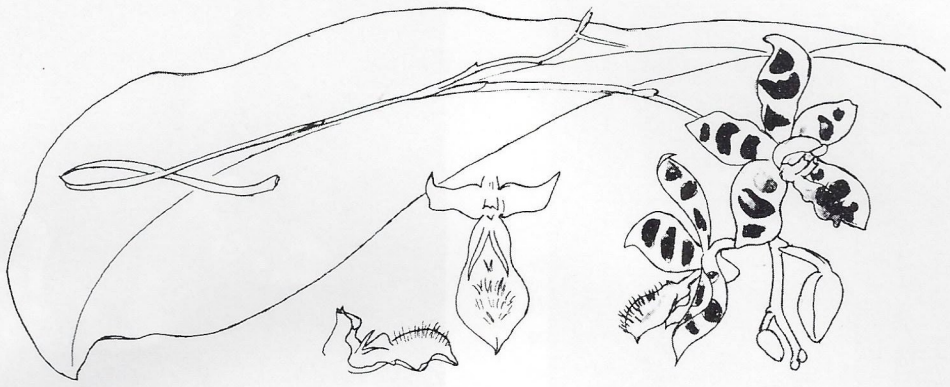
× *P. Stuartiana* = *P.* × Moonrise. 1969 (Crestwood Orchids)

Phalaenopsis Mariae Burbidge ex Warner & Williams, Orchid Album 2: t. 80, sub. t. 87, 1883; Sweet in Amer. Orch. Soc. Bull. 38:228, 1969.

Type: Philippine Islands: Sulu (Jolo) Island: Bunt-Doohan, alt. 2,000 ft. Coll. F. W. Burbidge s.n.! (W).

Plants epiphytic; roots many, fleshy, flexuous, glabrous, stem short, completely enclosed by imbricating leaf sheaths; leaves distichous, deflexed, fleshy, oblong-ligulate or obovate-ligulate, rarely oblong-elliptic, acute or obtuse at apex, up to 30 cm. long, to 7 cm. wide; inflorescence lateral, pendent, simple or branched, few- to many-flowered raceme, commonly shorter than subtending leaves, occasionally surpassing them; bracts distichous, triangular-ovate, cucullate, acute, up to 4 mm. long; sepals and petals spreading, similar, fleshy, oblong-elliptic to narrowly elliptic, obtuse above, slightly tapering below; dorsal sepals 16-22 mm. long, 7-11 mm. wide; lateral sepals oblique, 16-22 mm. long, 8-12 mm. wide; petals 15-17 mm. long, 6-9 mm. wide; lip fleshy, 3-lobed, lateral lobes oblong-ligulate, erose-dentate at the truncate apex, with a fleshy semilunate callus in the middle; midlobe ovate in outline; slightly angular and erose-dentate on both sides near apex, obtuse in front, at base provided with a fleshy lamella-like keel, running from base to middle, in front of which there is a cushion-like prominent callus completely covered with short, rather soft hairs; disc between lateral lobes of lip with a pair of superimposed bilobed acicular, fleshy calli, the anterior one at the junction of the midlobe and lateral lobes; length of whole lip 12-15 mm., width across lateral lobes 12 mm.; column fleshy, slightly arcuate, to 7 mm. long; pedicellate ovary to 2.5 cm. long. Chromosome no. $2n = 38$.

Distribution: Philippine Islands (Mindoro, Mindanao, Luzon, Sulu), West Borneo.



A copy of Burbidge's original watercolor of *P. Mariae* in the Reichenbach Herbarium.

SULU ISLANDS. Jolo Island, Bunt-Doohan. Coll. Burbidge s.n.! (BM,K,W). PHILIPPINE ISLANDS. Mindoro Island, Mt. Halcon. Coll. Ramos & Edaño 4279! (AMES, L,NY). Mindanao Island. Prov. Bukidnon. Coll. Escritor 21389! (AMES,K), 21433! (AMES,US). Prov. Davao. Coll. Loher 6011! (AMES); Mt. Hamiguitan. Coll. Edaño 12661! (L); Cottabato. Coll. Weber 220! (AMES); Lake Lanao, Camp Keithley. Coll. Clemens 626! (AMES,K). Luzon Island. Coll. Loher 587! (K). BORNEO. Kalimintang, Palangkaraya. Cult. Arboretum Res. Coll. LKW 76-2 PH-18! (AMES). Also living cultivated flowers have been studied.

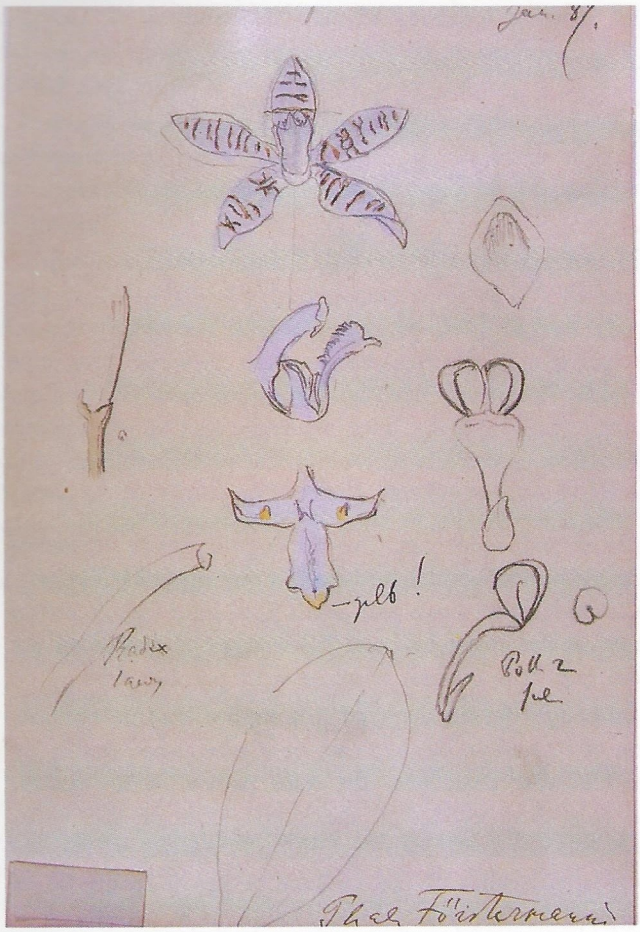
Illustrations: Orch. Digest 35:308, 1971; Amer. Orch. Soc. Bull. 40:774, 1971; Katoh & Futakuchi, Orchids in Colour, pl. 114, fig. 8, 1974.

Observations: The sepals and petals are white or cream-colored with large, heavy, maroon to chestnut-brown blotches and wide bars. The lip is pale mauve or purple with yellow calli on lateral lobes. In one specimen Reichenbach depicts the sepals and petals with light orange-brown spots on the apical half and lilac-purple or mauve on the basal half. The column is white with purplish base.

Although the lip shape of this species is quite reminiscent of *P. pallens,* the two may be distinguished readily by the following characters: the color pattern of the flower; the erose-dentate edge to the lateral lobes of the lip in *P. Mariae* versus the entire margin in *P. pallens;* the densely hairy apical callus of the midlobe of lip in *P. Mariae* as opposed to the partially hirsute callus in *P. pallens.*

This species has a very remarkable history. Two plants were originally collected on Sulu (Jolo) Island in the Sulu Archipelago by F. W. Burbidge, Superintendent of Trinity College Botanic Garden in Dublin, Ireland, while traveling

Photographs of the original drawings of *Phalaenopsis Mariae* made by Burbidge, now preserved in the British Museum of Natural History. Right: Colored drawing prepared on Sulu (Jolo) island in 1878, of the first specimen collected in the field. Left: Drawing of the first specimen flowered in cultivation at Glasnevin Botanic Gardens, Dublin, Ireland, in 1881.



Phalaenopsis Foerstermanii, a synonym of *P. pallens.* Copy of original watercolor by Reichenbach.

Phalaenopsis modesta.

Phalaenopsis Mariae.

Phalaenopsis maculata.

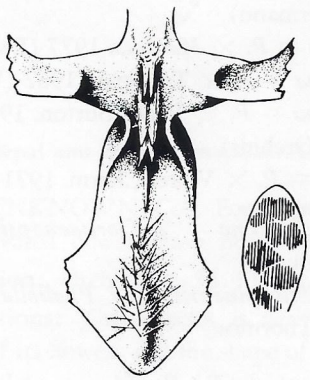
for Messrs. Veitch & Co. in the Malay Archipelago, in 1878. At that time Burbidge prepared a sketch and a note in the form of a manuscript about this species, which was sent to Veitch, who in turn sent it to Reichenbach, who made a copy of it, as well as a copy of a colored sketch made by Burbidge of *P. Mariae* (Reichenbach Herbarium Sheet Nr. 22350)* (the original letter is now in the British Museum) which is quoted here: "At first sight I mistook the plant when I found it in bloom for P. sumatrana, but a closer sight shows it to be really nearer P. Lueddemanniana and yet if you refer to the B. Mag. fig. of the last named species you will at once see that this plant is a distinct and showy one although my sketch entirely fails to show its beauty. The following is my description of the plant. Leaves 12-17 in. l., 3-4" b., glossy green. Flower spikes 12-24" long, often branched, 6-12 flowered, slender, cylindrical. Sepals and petals pure white, shaded with clear stained-glass-like lilac at their bases and having each about three bold purplish carmine blotches — not narrow here as in Lueddemanniana. The whole plant at first suggests P. sumatrana, but the crest of slender white hairs is scattered along the medial ridge of the central lobe of the lip and not collected in a dense brush-like tuft near its extreme point. This middle lobe of the lip is clear ruby purple while the same organ in P. sumatrana is white or lemon-colour with a double row of purplish oblong spots on either side of the medial ridge. The column of the present plant is not Coelogynoid or fringed at its apex and further (more) the point or apicula, at the extremity of the central lobe of the lip is depressed in our plant and subturned in P. sumatrana.

"Behind the flower of this plant (like that of the lovely Vanda limbata) possesses a character peculiarly its own and is it possibly more beautiful than the disposition of the more vivid translucent colours inside the flower — the various shades of lilac and carmine being most exquisitely blended on a ground colour as pure as snow.

"I found two plants only of which one only was in bloom. It was a double crowned plant — i.e., having two leading growths and bore four flower spikes bearing in all 30 flowers." F.W.B.

Reichenbach, having satisfied himself that the specimen sent by Burbidge was a new species, refrained from describing it, awaiting Burbidge's publication. In the meantime Veitch sent flowering material to Reichenbach in May, 1881, and May, 1882, as shown by his drawings in his herbarium. In 1883, this species was described for the first time by Warner & Williams, Orchid Album 2: t. 80, 1883, attributing it to Reichenbach. Reichenbach was annoyed at being the author of *P. Mariae* and wrote a letter to Williams, a portion of which has been published in Warner & Williams, Orchid Album 2: sub. t. 87, 1883, as follows: "We have been requested by Professor Reichenbach to mention that there exists some misapprehension as to the above quoted name, which was not given by him, as stated in the text which accompanies Plate 80, but was used by Mr. Burbidge, who dedicated the plant to his wife on the very spot where he found it, in a little Sondaic Island. 'I have, indeed' he adds, 'accepted the name, but of course left the publication to the author; had I named the plant, I would have published it in Gardeners' Chronicle. It is painful to me to write thus, but to justify myself I must do so; for now-a-days one is frequently worried with prescriptions how some unknown plant must be named provided it be new, and I have always declined to name plants in honour of ladies whom I have never seen, and who do not, so far as I know, stand in any special relation to plants.'"

Some years later this species was imported by Messrs. Low & Co. from the neighboring island of Mindanao where it was more plentiful. On this latter island it is said to grow on trunks and branches of trees always in dense shade.



Dorsal sepal and lip of *P. Mariae*.

This species is native to the Philippines, having been reported from Mindanao and Mindoro Islands, as well as from the Sulu Islands. Ridley reported it also from Borneo.

The inflorescence tends to be pendent. The flowers which may be up to 1½ inches or more across have been at times mistaken for *P. sumatrana* and even *P. Lueddemanniana.* The slightly fragrant flowers of *P. Mariae* are white to cream-color and sometimes they even have a greenish suffusion. The sepals and petals usually have three or four, sometimes more, rather bold, purplish carmine blotches; whereas in *P. sumatrana* and *P. Lueddemanniana* the markings are in the form of horizontal bars. The column of *P. sumatrana* is entirely different also. The midlobe of its lip is a rich magenta-carmine, margined with white and with

*The original colored sketch is in the Burbidge manuscript kept in the British Museum of Natural History and is reproduced here with another drawing made by him in 1881, when the first plant flowered in Dublin.

an apical callus covered with bristle-like hairs. The midlobe of the lip of *P. maculata,* of course, is glabrous.

The name, *"Phalaenopsis Mariae* var. *alba,"* as was pointed out in The Orchid Digest 34:302, 1970, is actually a synonym of *Phalaenopsis pallens.* The plant, which was exhibited as *"Phalaenopsis Mariae* var. *alba* 'Crestwood' " and awarded a Certificate of Botanical Merit by the judges of the American Orchid Society in 1963, is a misidentified plant for which the correct name is *Phalaenopsis Lueddemanniana* var. *ochracea.*

Excluded Variety

P. Mariae var. *alba* Ames & Quisumb. in Phil. Journ. Sci. 56:461, 1935. See *P. pallens* (Lindl.) Rchb.f.

Primary Crosses

Phalaenopsis Mariae Burbidge

× *P. amboinensis* = *P.* × Macassar. 1962 (Kirsch)
× *P. cornu-cervi* = *P.* × Little Leopard. 1973 (Wallbrunn)
× *P. equestris* = *P.* × Rose Marie. 1961 (Kirsch)
× *P. fasciata* = *P.* × Tigress. 1970 (Dewey)
× *P. fuscata* = *P.* × Golden Jewel. 1973 (Dobkin)
× *P. Lindenii* = *P.* × Marie Linden. 1975 (Moir)
× *P. Lueddemanniana* = *P.* × Tigerette. 1974 (Hausermann)
× *P. maculata* = *P.* × *Marilata.* 1977 (Ewing Orchids)
× *P. Sanderana* = *P.* × Talisman. 1962 (Vaughn)
× *P. sumatrana* = *P.* × James Burton. 1978 (MAJ Orchids)
× *P. violacea* = *P.* × Violet Charm. 1971 (Freed)

× *Doritis pulcherrima* = × *Doritaenopsis* Imp. 1969 (Wallbrunn)
× *Kingiella philippinensis* = × *Phaliella* Freckles. 1972 (Thornton)

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Subsection GLABRAE Sweet in Amer. Orch. Soc. Bull. 37:874, 1968; *ibid.* 38:231, 1969.

Column with non-developed, low, marginate, entire clinandrium or anther bed; disc between the lateral lobes with a single bifid callus; midlobe of lip fleshy, convex, incrassate toward the tip and glabrous.

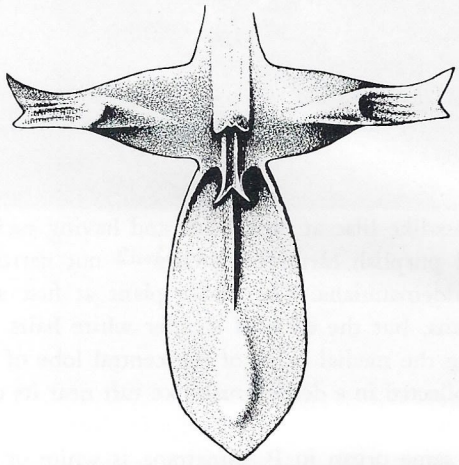
Type: *Phalaenopsis modesta* J. J. Smith.

Enumeration of Species

Phalaenopsis modesta J. J. Smith in Icones Bogorienses 3:47, t. 218, 1906; Sweet in Amer. Orch. Soc. Bull. 38:232, 1969.

Type: Borneo, without precise locality. Cult. Hort. Bogor. Coll. Nieuwenhuis s.n.! (BO).

Epiphytic; roots fleshy, compressed, flexuous, glabrous; stem short, completely enclosed by imbricating leaf sheaths; leaves distichous, fleshy, one to four obovate to obovate-lanceolate or obovate-elliptic, acute, tapering to a subpetiolate base, articulate with the sheaths, 11-15 cm. long, 4-6 cm. wide; inflorescence slender, arcuate, commonly racemose, rarely subpaniculate, shorter than subtending leaves, few-flowered; bracts distichous in a semifractiflex rachis, ovate-lanceolate, cucullate, to 3 mm. long; flowers rather delicate with spreading segments; dorsal sepal oblong-elliptic to obovate, obtuse or arcuate, 12-15 mm. long, 5-6 mm. wide; lateral sepals oblique, ovate or ovate-elliptic, acute, dorsally carinate, mucronulate at apex, 12-15 mm. long, 7-8 mm. wide; petals narrowly elliptic or ovate-elliptic,



Lip of *P. modesta.* Drawn from type.

acute, rarely subobtuse, usually shorter than sepals, 11-15 mm. long, 4-5 mm. wide; lip 3-lobed, lateral lobes subquadrate oblong, narrowing toward subtruncate bifid apex with cushion-like callus in middle; midlobe oblong-elliptic to ovate-elliptic, rounded at apex, convex, with a lamella-like keel in center from base to middle, at apex provided with an elongate cushion-like glabrous callus, very rarely decorated with a few short hairs, the disc between the lateral lobes provided with a pair of superimposed fleshy apically bifid calli, the anterior one is grooved in middle and situated at junction of midlobe and lateral lobes, length of whole lip 12-14 mm. long, width across lateral lobes 12-14 mm.; column fleshy, cylindric, somewhat arcuate, slightly dilated toward base, 7-9 mm. long; pedicellate ovary to 2 cm. long.

Distribution: Borneo, Sabah (North Borneo).

BORNEO, without precise locality. Cult. Hort. Bogor. Coll. Nieuwenhuis s.n.! (BO); southeast region. Coll. Winkler 2458! (AMES,L); West Kotai. Coll. Endert 4789! (BO). SABAH. Dallas, Mt. Kinabalu. Coll. J. & M. S. Clemens 29302! (AMES,K,L,NY); Coll. Carr 3746! (AMES). Prov. Elphiastone, Tawao. Coll. Elmer 20869! (K,L,M). ORIGIN UNKNOWN. Cult. Bogor s.n.! (L,P). Also living flowers have been examined.

Observations: The type is reported to have flowers with white or pale rose sepals and petals, banded with fine purple transverse bars or stripes on basal halves which turn

greenish with age. The lip is white with a purple apex and yellow calli on lateral lobes.

J. J. Smith in the original description states that the callus on the midlobe of the lip is velvety hirsute. This character, however, is not present in any of the specimens examined by me. On a single specimen only I noted two or three hairs on the callus.

Although I have examined the actual type specimen of the species, I have had at my disposal a number of additional herbarium sheets from the Royal Botanic Gardens, Kew, England, Rijksherbarium, Leiden, Netherlands, and Orchid Herbarium of Oakes Ames, Harvard University, all identified by J. J. Smith, and representing specimens collected in the Botanical Garden in Bogor, Indonesia, between 1903-1905. Undoubtedly these specimens were taken from the same plants upon which J. J. Smith based his description in 1906.

Phalaenopsis maculata Rchb.f. in Gard. Chron. n.s. 16: 134, 1881; Sweet in Amer. Orch. Soc. Bull. 38:233, 1969.

Type: Borneo, without precise locality. Coll. Curtis s.n.! (W).

Syn.: *Phalaenopsis muscicola* Ridl. in Trans. Linn. Soc. 3:373, 1893.

Type: Malay Peninsula, Pahang State, Tahan River. Coll. Ridley s.n.! (BM).

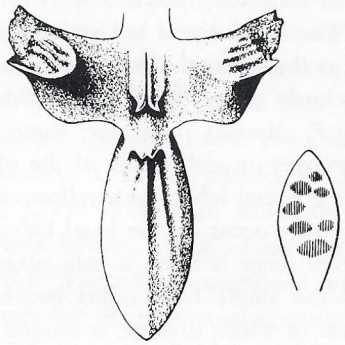
Phalaenopsis cruciata Schltr. in Fedde Rep. 8:457, 1910.

Type: Borneo. Koetai, near Long Sele. Coll. Schlechter 13480.

Plants epiphytic; roots copious, fleshy, flexuous, glabrous; stem very short, completely enclosed by imbricating leaf sheaths; leaves 2 or 3, distichous, fleshy, oblong-ligulate to oblong-elliptic, oblanceolate, acute at canaliculate apex, gradually narrowing toward base, 15-21 cm. long, 2.5-4 cm. wide; inflorescence lateral, suberect to arcuate, as long as the subtending leaves, rarely exceeding, simple raceme, rarely branched, few-flowered; flowers small, delicate in texture, distichous; dorsal sepal oblong-lanceolate to oblong-elliptic, acute or obtuse, mucronate at tip, 13-18 mm. long, 4-6 mm. wide; lateral sepals somewhat oblique, ovate-oblong to elliptic, acute or obtuse, dorsally carinate, mucronate at tip, 13-15 mm. long, 5-6 mm. wide; petals narrowly oblong-lanceolate to oblanceolate, acute or obtuse, 12 mm. long, 4 mm. wide; lip 3-lobed, fleshy, cross-shaped, lateral lobes subquadrate, apical half fleshy incrassate into a horseshoe-shaped inside grooved callus; disc between lateral lobes with a pair of approximate calli, the anterior part diverging, hence bifid; midlobe elliptic or oblong-elliptic; strongly convex, indistinctly with longitudinal grooves without either a prominent keel or an apical swelling or callus; disc at base in front of junction with lateral lobes with a short obortive bidentate callus in lieu of the common acicular processes; length of whole lip 10 mm., width across lateral lobes 8 mm.; column 7 mm. long, cylindric, slightly arcuate, hardly or not at all dilated toward base; pedicellate ovary 2 cm. long.

Distribution: Malaysia (Pahang, Tahai River), Borneo, Sarawak.

MALAY PENINSULA. Pahang State, Tahan River. Coll. Ridley s.n.! (BM). BORNEO. Without precise locality. Coll. Curtis s.n.! (W); Coll. Haviland s.n.! (K). Koetai, near Long Sele. Coll. Schlechter 13480. SARAWAK. Kuching, Bidi Cave. Coll. J. & M. S. Clemens 20710! (K,L).



Dorsal sepal and lip of *P. maculata*. Drawn from type.

ORIGIN UNKNOWN. Coll. Foersterman s.n.! (W). Also living cultivated flowers have been studied.

Illustration: Orch. Dig. 35:308, 1971.

Observations: This species is easily identified by the small size of its flowers and the shape of the lip. The flowers of *P. maculata* are about an inch across, and hence, are smaller than *P. Mariae* with which it is sometimes confused. The distinctions between these two species irrespective of markings and size of flowers may be summarized as follows: *Phalaenopsis Mariae* has two bifid calli between the lateral lobes and a hairy apical callus at the apex of the midlobe; whereas *Phalaenopsis maculata* has a single bifid callus between the lateral lobes, the apices of which diverge, and the apex of the midlobe is devoid of a swollen callus and hairs.

Phalaenopsis maculata flowered for the first time in the Veitch establishment in 1881, from the original collection by Curtis in Borneo. When Reichenbach first described the species from the above specimen (Gard. Chron. n.s. 16:134, 1881) he wrote: "This is a little gem — one of the smallest Phalaenopsids of the same group as P. violacea, with pallid sepals and petals, with a few dark purple-brown blotches on the inner side, but apparent also on the outside. The chief ornament on the lip is the central lobe, a deep purple, fleshy, semiterete body. The lateral lobes are obtus-

angular, the point of the triangle being obliterated by its sessile position on the disc, with a yellow callus, a purple anterior border, and numerous small spots. A little two-toothed plate lies on the base of the middle lacinia. For some time I have had in my herbarium a wild flower gathered by Mr. Curtis in Borneo, given me by Messrs. Veitch; I did not know, however, that it would prove such a lovely gem as it now does in the fresh flower."

It was subsequently collected also by Haviland at Brang, Sarawak, along the Sarawak River and by Clemens at Bidi Cave, Mt. Boulder Forest. Ridley also collected it along the Tahan River, Pahang State in Malaya under the name of *Phalaenopsis musicola.*

The flowers have a white to cream ground-color often with a greenish suffusion, blotched with brownish red to purplish red. The fleshy lip is red and there are no hairs and no callus at the apex of the midlobe. A glance at the ink drawings clearly shows the characteristics (and the differences from *P. Mariae*). However, there are indistinct longitudinal grooves on either side of the obscure median keel. Each of the lateral lobes has a yellow callus and small reddish dots usually occur on the basal halves; whereas on the apical halves there is often a pale magenta suffusion. The shape of the single bifid callus between the lateral lobes, the apices of which diverge, is unique in this group.

An examination of the type of *P. musicola* and a study of the description of *P. cruciata* revealed no differences by which they could be maintained as separate taxa.

Primary Crosses

Phalaenopsis maculata Rchb.f.

× *P. amboinensis* = *P.* × Good Cheer. 1973 (Hager)
× *P. equestris* = *P.* × Little Sister. 1973 (Hager)
× *P. fasciata* = *P.* × Little Mac. 1978 (Herb Hager)
× *P. Lindenii* = *P.* × Li'l Bit. 1970 (Jones & Scully)
× *P. Mariae* = *P.* × *Marilata.* 1977 (John Ewing Orchids)
× *P. violacea* = *P.* × Spring Rain. 1974 (Hager)

Natural Hybrid

Phalaenopsis × Gersenii (Teijsm. & Binn.) Rolfe in Orch. Rev. 25:227, 1917.

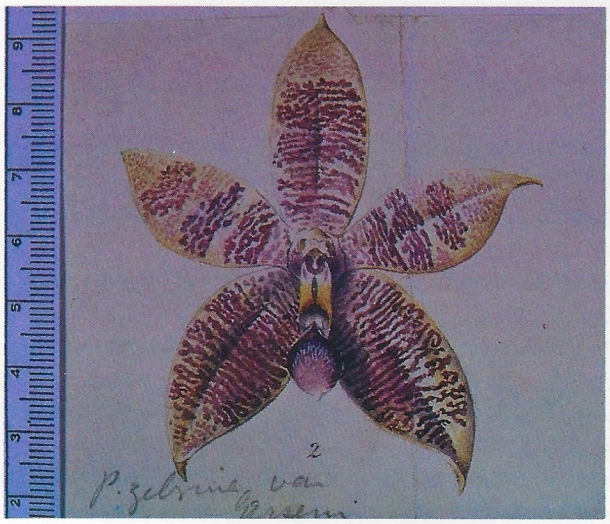
Basionym: *Phalaenopsis zebrina* var. *Gersenii* Teijsm. & Binn. in Natuurk. Tijdschr. Nederl. Indië 24:320, 1862.

Syn.: *Phalaenopsis sumatrana* var. *Gersenii* (Teijsm. & Binn.) Rchb.f. in Gard. Chron. 506, 1865; Sweet in Amer. Orch. Soc. Bull. 37:1095, 1968.

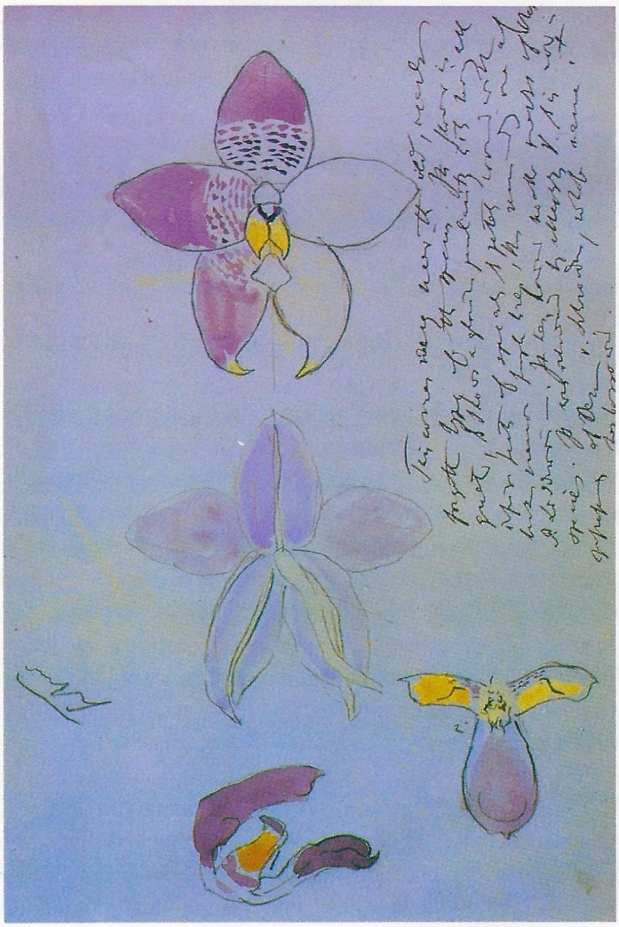
Type: Sumatra, without precise locality. Coll. Gersen s.n. Icon. Binnendijk! (K).

Phalaenopsis zebrina var. *lilacina* Teijsm. & Binn. in Natuurk. Tijdschr. Nederl. Indië 24:320, 1862.

PLATE 17



Phalaenopsis zebrina var. *Gersenii,* a synonym of *P.* × *Gersenii.* Copy of original watercolor by Teijsmann & Binnendijk.



Phalaenopsis violacea var. *Schroederana,* a synonym of *P.* × *Gersenii.* Copy of original watercolor by Reichenbach.

Phalaenopsis sumatrana var. *lilacina* (Teijsm. & Binn.) Rchb.f. in Gard. Chron. 506, 1865.

Type: Sumatra, without precise locality. Coll. Lobb s.n.

Phalaenopsis* × *Gersenii.

Phalaenopsis violacea var. *Schroederana* Rchb.f. in Gard. Chron. n.s. 18:680, 1882.

Phalaenopsis violacea var. *Schroederi* Hort. in Journ. Hort. & Cottage Gard. ser. 3, 5:155, 1882.

Phalaenopsis violacea var. *Schroederi* Rodigas in Ill. Hort. 32:173, t. 576, 1885.

Type: Origin unknown. Cultivated in 1882 by Baron Schroeder s.n.! (W).

Phalaenopsis × *singuliflora* J. J. Smith in Fedde, Rep. 31:80, 1932; in Orch. Rev. 40:173, 1932.

Type: West Borneo, Tajan, east of Pontianak. Cult. Hort. Bogor s.n.! (BO,L).

Phalaenopsis sumatrana Korth. & Rchb.f. × *P. violacea* Witte: epiphytic plant, variable in appearance; leaves large, obliquely spathulate to oblong-elliptic, obtuse, up to 33 cm. long, 13 cm. wide; inflorescence pendulose, simple or branched with a flexuous rachis, up to 40 cm. long; bracts bifarious, triangular-cymbiform, up to 7 mm. long; flowers large, fleshy, produced in succession, fragrant; sepals and petals pale green to creamy white with fine transverse bars of magenta or dark violet; side lobes of lip yellow, midlobe clear violet; dorsal sepal elliptic to ovate-elliptic, acute to abruptly acuminate, up to 3.5 cm. long, 1.5 cm. wide; lateral sepals obliquely oblong-elliptic, abruptly acuminate with recurved, carinate apex, up to 4 cm. long, 1.7 cm. wide; petals from cuneate base broadly elliptic, acute, up to 3.2 cm. long, 1.5 cm. wide; lip 3-lobed, lateral lobes erect, obliquely oblong-quadrangular, midlobe porrect, elliptic-rhombic, acute or subapiculate, hirsute; disc between the lateral lobes with a bifid callus; whole lip up to 2.25 cm. long, midlobe up to 8 mm. wide; column with a short foot, up to 1.3 cm. long; pedicellate ovary sulcate, up to 3 cm. long.

Distribution: Sumatra, West Borneo, Sarawak.

Illustrations: Amer. Orch. Soc. Bull. 37:1097, 1968.

Observations: This natural hybrid was discovered by Gersen in the Province of Palembang, Sumatra. Rolfe in The Orchid Review 25:227, 1917 writes:

"A fortunate circumstance has led to the recovery of an important type drawing, including an interesting Phalaenopsis that has been completely lost sight of. In 1862 a Phalaenopsis was described under the name of P. zebrina var. Gerseni (Teijsm. & Binn. in *Nat. Tijdschr. Nederl. Ind.*, xxiv. p. 320), but it now proves to be quite distinct. The circumstances of its recovery are interesting. There is a drawing in the Kew collection of Illigera pulchra, Blume, a Malayan climbing shrub, which is localised, "Banca, Binnendijk." A reference to this drawing had to be made, when it was noticed that there was a painting on the reverse side of the paper, which proved to be three single flowers of Phalaenopsis. The names had been added by Sir J. D. Hooker, and on reference to the Hooker correspondence a letter was found, from M. J. Binnendijk, dated May 1st, 1861, in which it is remarked: 'Inclosed I send you a sketch of three Phalaenopsis flowers, n. 1. Ph. zebrina, n. 2, Ph. z. var. Gerseni, and n. 3, Ph. violacea, of which there is another variety with white flowers, all of which may be of great value to amateurs.' The others mentioned were described at the same time, but P. zebrina afterwards proved synonymous with P. sumatrana, Rchb.f., and P. violacea had been described just previously by Reichenbach under the same name. The paintings are most carefully done, and quite life-like, and the interesting point is that the so-called var. Gersenii is exactly intermediate between the other two, and is clearly a natural hybrid between them. Coming to the history of the plants, we find that both P. zebrina and P. violacea were collected at Moeara Enim, in the Province of Palembang, the former by Gersen and the latter by Teijsmann. The var. Gerseni is said to have the habit of P. zebrina, but to differ in having the segments striped with violet and spotted with the same colour at the apex. The habitat is not mentioned, but it was presumably collected by Gersen with P. zebrina. There is also described a P. zebrina var. lilacina, said to have been collected by Th. Lobb, with transverse lilac lines on the lateral sepals, and the front lobe of the lip lilac; characters belonging rather to P. violacea than to P. zebrina, hence the suspicion that this may be another form of the same hybrid."

The illustration of *P. zebrina* var. *Gerseni* is reminiscent of *P. hieroglyphica.* However, these two are easily kept separate by the structure of the column.

I have received living flowers of an artificial cross, *P. amboinensis* × *P. violacea,* which very closely approximates the illustration of *P. sumatrana* var. *Gerseni* in size and color, with the exception that there are no tufts of hairs on the midlobe of the lip.

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PARAPHALAENOPSIS A. D. Hawkes in Orquidea (Brazil) 25:212, [1963] Apr. 1964.

Type: *Phalaenopsis Denevei* J. J. Smith = *Paraphalaenopsis Denevei* (J. J. Smith) A. D. Hawkes.

Dorsal sepal free, erect; lateral sepals spreading, decurrent on column-foot. Petals spreading to reflexed, obliquely inserted onto column-foot by a fleshy claw. Lip rigidly confluent with column-foot, 3-lobed, lateral lobes erect, parallel with column, midlobe a direct extension of the conduplicate, plate-like callus situated at the junction of the lobes, arcuately forward projecting; disc prominently excavate behind the callus into a small, sac-like nectary. Column cylindric, basally extended into a 3-dactylate foot accommodating the petals and lip. Stigma transversely elliptic to reniform; rostellum well-developed. Pollinia 2, on broadly cuneate stipe with a large gland. Ovary cylindric, costate.

Epiphytic plants with branched aerial roots. Stem short, few-leaved. Leaves elongate, terete, canaliculate. Inflorescence with a distinct peduncle, and a congested rachis, few-flowered.

Three species native to Borneo.

In the introductory material to the genus *Phalaenopsis* I have already mentioned some of the reasons for my recognizing *Paraphalaenopsis.* The distinction between these two genera may be summarized in the following points, none of which occurs in *Phalaenopsis:*

1. Leaves elongate, terete.
2. Petals inserted obliquely onto column-foot through a fleshy, claw-like base.
3. Disc of lip prominently excavate behind the callus into a small, sac-like nectary.
4. Midlobe of lip is a direct extension of the plate-like callus at the junction of the three lobes.
5. Column with a 3-dactylate foot.
6. Breeding behavior: i.e., none of the species will hybridize with species of the genus *Phalaenopsis,* but will with species of other Vandaceous genera.

Vegetatively the plants of *Paraphalaenopsis* resemble more closely the plants of the genus *Cordiglottis* than those of *Phalaenopsis. Paraphalaenopsis* plants are not compatible genetically with those of *Phalaenopsis,* but they will hybridize with members of other genera, *Aerides, Arachnis, Euanthe, Luisia, Papilionanthe, Renanthera* and *Vanda.* This fact is of crucial importance in evaluating generic limits for the lack of genetic compatibility is a rare phenomenon in the entire monopodial alliance. The evolutionary importance of genetic incompatibility has been emphasized in the literature on many occasions. As to the nature of the terete leaves, it should be remembered that it is a derived evolutionary modification originating ontogenetically from the conduplicate stage. Because of these morphological and evolutionary attributes, *Paraphalaenopsis* is accepted here as a distinct genus.

KEY TO THE SPECIES

1. Sepals and petals white inside; midlobe of lip lemon-yellow with transverse, purple bars, bifid at tip, each segment subulate; peduncle of inflorescence prominently elongate.....**P. serpentilingua**

1a. Sepals and petals colored inside; midlobe of lip spathulate, bilobed; peduncle of inflorescence conspicuously short to abbreviate 2

2. Sepals and petals greenish yellow; lateral lobes of lip oblong-falcate, acuminate .....**P. Denevei**

2a. Sepals and petals pale lilac; lateral lobes of lip linear-oblong, rounded .....**P. Laycockii**

ENUMERATION OF SPECIES

Paraphalaenopsis serpentilingua (J. J. Smith) A. D. Hawkes in Orquidea (Brazil) 25:212, [1963] 1964.

Basionym: *Phalaenopsis serpentilingua* J. J. Smith in Orch. Rev. 41:147, 1933.

Type: West Borneo, Singkawang (Sintang). Cult. Hort. Bogor s.n.! (L).

Syn.: *Phalaenopsis Denevei* var. *alba* Price, Orchid Culture in Ceylon and the East, ed. 2, 90, 1933.

Type: Cultivated in Ceylon. No specimen preserved.

Phalaenopsis Simonsei Simonse in Amer. Orch. Soc. Bull. 29:531, 1960. *Nomen nudum.*

Epiphytic, pendent plants; aerial roots thick, not branched; stem short, few-leaved, up to 3 cm. long; leaves terete with a distinct groove, up to 30 cm. long, 7 mm. wide; inflorescence erect to ascendent, elongate, terminated by a compact, up to 7-flowered rachis, including the rachis up to 35 cm. long; flower small- to medium-size, scented; sepals and petals white inside, lip lemon-yellow, transversely striated with purple; dorsal sepal elliptic to obovate-elliptic, acute to subapiculate, up to 1.6 cm. long and 1 cm. wide; lateral sepals obliquely elliptic to ovate-elliptic, acute, up to 1.8 cm. long, 1.1 cm. wide; petals from a fleshy, cuneate base rhombic-lanceolate, acute to subobtuse, up to 1.6 cm. long, 7 mm. wide; lip 3-lobed; lateral lobes falcate-linear, subulate, up to 1 cm. long; midlobe recurved, linear with a distinct bifid apex, the segments of which are subulate and somewhat diverging, up to 9 mm. long; disc with a conduplicate, dentate callus; column short, up to 6 mm. long; pedicellate ovary 6-costate, up to 6 cm. long.

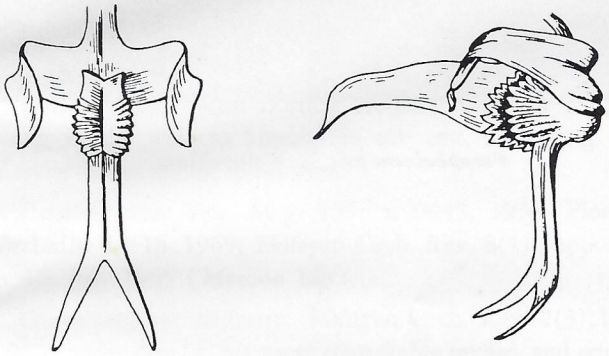
Distribution: West Borneo. Singkawang.

WEST BORNEO. Singkawang. Cult. Hort. Bogor. s.n.! (BO,L).

Illustration: Amer. Orch. Soc. Bull. 35:Cover, Sept. 1966.

Observations: J. J. Smith (Orch. Rev. 41:147, 1933) says that "it does not differ in habit from P. Denevei. The

flower stalks, however, are much longer, and extend like those of P. amabilis and its allies. At their end they bear a raceme of about seven flowers (so far as is known yet). The flowers appear to be somewhat smaller than in P. Denevei, and white. Their general shape is quite the same as in the older species, but the lip shows well marked differences. The side lobes are much more pointed. It is, however, the middle lobe which especially attracts attention. In P. Denevei this ends in a small, transverse, blunt, retuse blade, whereas in the new species it splits up into two diverging, narrow, acute laciniae, closely imitating a snake's tongue, hence the specific name I am proposing for the plant. The double crest between the two side lobes is, in



Lip of *Paraphalaenopsis serpentilingua.*

P. Denevei — apart from the basal awls — crenate, but in P. serpentilingua, sharply point."

According to a note from Mr. R. C. Bakhuizen van den Brink, of the Buitenzorg Botanic Gardens, the sepals and petals are white, tinged with light violet or flesh-colour on the back. The lip is lemon-yellow, the side lobes light orange, covered all over with transverse purple bars. The lemon-yellow crest is dotted purple.

According to Dr. Bloemsma's notes, *P. serpentilingua* grows on very wet moss-grown rocks. Mr. G. A. de Mol, Pontianak, states that the plant occurs in the environs of Sintang, West Borneo, where it grows together with *P. Denevei.*

Prior to May 1933 when *Paraphalaenopsis serpentilingua* was first described as a species, plants were already in cultivation under the erroneous name of *P. Denevei* var. *alba.*

Phalaenopsis Simonsei, mentioned by Mr. Simonse in the American Orchid Society Bulletin 29:531, 1960, is a name without legal standing for it was never formally described. The plants were collected in Central Borneo, along the upper Kapuas River at Sanggau area (Pontianak) in early March 1958. Judging from the published photograph which clearly shows á long peduncle and the bifurcate tip of the lips, as well as from the color description of the flowers, *P. Simonsei* is identical with *Paraphalaenopsis serpentilingua.*

PRIMARY CROSSES

Paraphalaenopsis serpentilingua (J. J. Smith) A. D. Hawkes

× *P. Denevei* = *Paraphalaenopsis* × *Thorntonii* (Holttum) A. D. Hawkes. (Nat. hybr.)

× *P. Denevei* = *Paraphalaenopsis* × Sunny. 1964 (Mrs. Gracia Lewis as *Phalaenopsis* × Sunny)

× *P. Laycockii* = *Paraphalaenopsis* × Kolopaking. 1969 (Ilgenfritz: L. K. Wie as *Phalaenopsis* × Kolopaking)

× *Aerides odorata* = × *Pararides* Trengganu. 1970 (Kirsch, as × *Aeridopsis* Trenggau)

× *Arachnis Hookerana* = × *Pararachnis* Adrian Cheok. 1965 (R. Cheok: Dr. Yeoh, as × *Arachnopsis* Adrian Cheok)

× *Papilionanthe teres* = × *Parapapilio* Serpentinda. 1966 (T. P. Tan, as *Vandaenopsis* Serpentinda)

× *Renanthera matutina* = × *Pararenanthera* Heng-ye. 1973 (Koh Keng Hoe, as × *Renanthopsis* Heng-ye)

× *Renanthera philippinensis* = × *Pararenanthera* Steven Lim. 1975 (Koh Heng Hoe, as × *Renanthopsis* Steven Lim)

× *Renanthera Storiei* = × *Pararenanthera* Yee Peng. 1966 (Edith Chun: How Yee Peng, as × *Renanthopsis* Yee Peng)

× *Vanda coerulea* = × *Paravanda* Frail Fancy. 1971 (Singapore Orchids, as × *Vandaenopsis* Frail Fancy)

× *Vanda Dearei* = × *Paravanda* Moonbeam. 1962 (Singapore Orchids, as × *Vandaenopsis* Moonbeam)

× *Vanda lamellata* = × *Paravanda* Emily Yong. 1963 (Yong Swee Keen, as × *Vandaenopsis* Emily Yong)

× *Vanda luzonica* = × *Paravanda* Tiptoes. 1964 (Singapore Orchids, as × *Vandaenopsis* Tiptoes)

× *Vanda tessellata* = × *Paravanda* Quietude. 1972 (Singapore Orchids, as × *Vandaenopsis* Quietude)

× *Vanda tricolor* = × *Paravanda* Helene Tan. 1967 (Gaw Synn Ghee, as × *Vandaenopsis* Helene Tan)

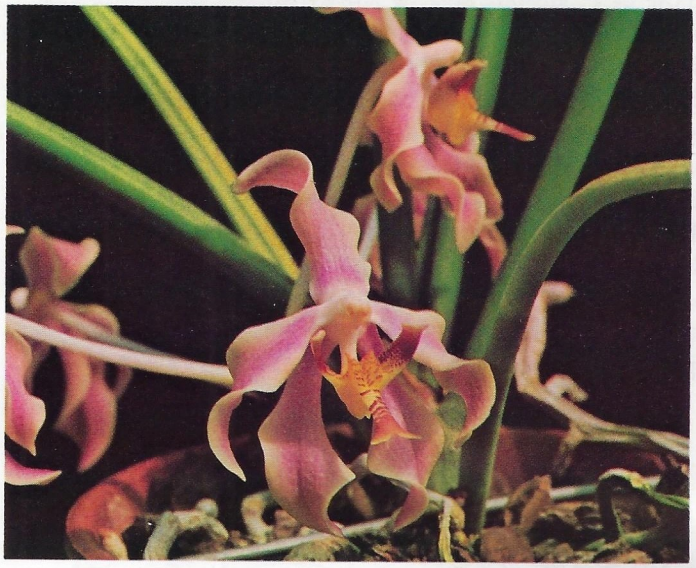
Paraphalaenopsis Denevei (J. J. Smith) A. D. Hawkes in Orquidea (Brazil) 25:212, [1963] 1964.

Basionym: *Phalaenopsis Denevei* J. J. Smith in Rec. Trav. Bot. Néerl. 22:264, 1925.

Type: West Borneo, near Pontianak, Nanga Djetah Plantation. Cult. Hort. Bogor. Coll. de Neve sub. 484! (L).

Epiphytic plants with branched aerial roots; stem short, 3- to 6-leaved, up to 3 cm. long; leaves fleshy, elongate, terete with a narrow groove on the upper surface, up to 70 cm. long, 1 cm. in diameter; inflorescence axillary, produced in succession; peduncle short, up to 2.5 cm. long; rachis rather

Paraphalaenopsis serpentilingua.



Paraphalaenopsis × Kolopaking.

Paraphalaenopsis Denevei (Bot. Mag. 159: t. 9445, 1936).

Paraphalaenopsis Laycockii.

congested, commonly few-flowered, up to 5, rarely robust specimens have been seen in nature which bore up to 13 flowers; bracts triangular, adpressed, up to 5 mm. long; flowers with spreading segments; sepals and petals greenish yellow to yellow-brown, lip white with large crimson spots; dorsal sepal ovate-elliptic to narrowly elliptic, acute, up to 2.6 cm. long, 1 cm. wide; lateral sepals obliquely ovate-elliptic, acute, up to 2.8 cm. long, 1.3 cm. wide; petals from a fleshy cuneate base ovate-lanceolate with a falcate-acuminate apex, up to 2.4 cm. long, 1 cm. wide; lip 3-lobed; lateral lobes obliquely oblong-falcate to falcate-triangular, acuminate, anterior margin thickened, up to 1 cm. long, 0.6 cm. wide; midlobe recurved linear-spathulate, papillose, apex retuse; disc 3-costate which are confluent with the plate-like, subquadrate, rugose-denticulate callus; whole lip 1.7 cm. long, 2 cm. wide; column cylindric, papillose, white, up to 1 cm. long; pedicellate ovary terete, up to 6 cm. long.

Distribution: West Borneo, from Sambas and Singkawang in the west to Sintang in the east, and along the Kapuas River in the southwest.

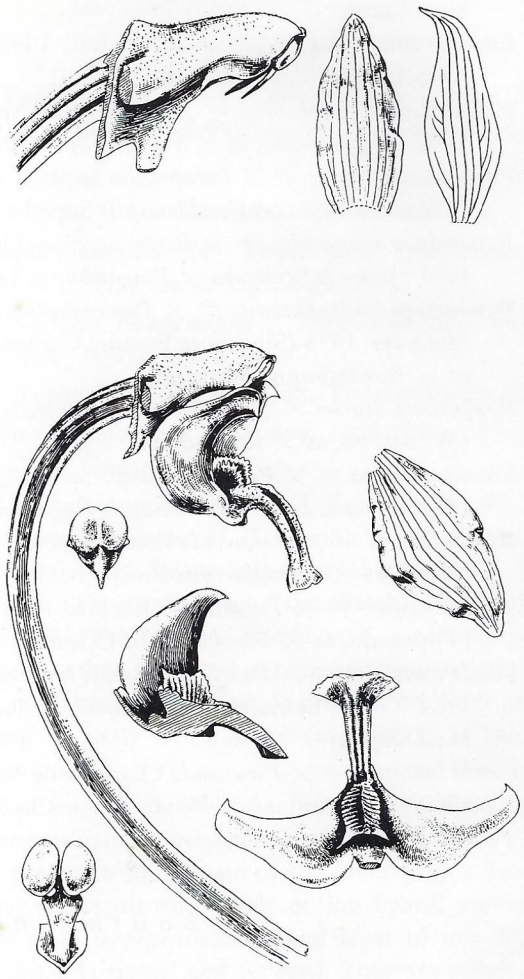
Illustrations: Bot. Mag. 159: t. 9445, 1936; Florida Orchidist 12:18, 1969; Malayan Orch. Rev. 8(1): opposite p. 16, July 1965 ('Maroon Lip').

Observations: Holttum (Malayan Orch. Rev. 2(3):121, 1936) notes that "it is a most remarkable orchid, and equally remarkable is the fact that it was not discovered until 1925, though it is evidently abundant in its native habitat. The species was first discovered near Pontianak in West Borneo, by Herr T. A. De Neve, who sent plants to Buitenzorg; flowers from these were sent to Dr. J. J. Smith who named and described them. The first flowering in Europe was in 1929 (at Leiden) and flowering plants were first exhibited in England so recently as 1934.

"When a quantity of plants of *P. Denevei* was gathered by collectors, it was found that with it occurred a second species differing in its flowers from *P. Denevei,* but not appreciably different in its leaves. This was called *P. serpentilingua* by Dr. Smith, from the mid-lobe of the lip resembling a snake's forked tongue."

De Neve wrote as follows about the plants: "The flowers appear chiefly in the rainy season. Strong plants bear more than one inflorescence, each with 11-13 flowers, which last two to three weeks and have a pleasant scent. The plants were only found on a special kind of tree, known to the natives as *Melaban,* which grows only beside rivers. They stand the sun well if the surroundings are moist. Strong plants have leaves up to 75 cm. (30 inches)."

In a letter (Orch. Rev. 41:75-76, March 1933), written early in 1933, from J. E. Zurowitz, The Lake View Nursery, Sambas, West Borneo which included photographs and a description, the plant was named "Vanda Denevei, the Pride of Borneo." In addition to a color description of the flower he states: "The leaves are . . . of dark bluish-green



Paraphalaenopsis Denevei. **Copy of original drawings by J. J. Smith.**

shade, three to six in number and of an average length of about 18 inches.

"The plants flower freely, mostly three or four times a year. The flowers last about three weeks and exhale a very delicate perfume."

PRIMARY CROSSES

Paraphalaenopsis Denevei (J. J. Smith) A. D. Hawkes

× *P. Laycockii* = *Paraphalaenopsis* × Boediardjo. 1972 (Kolopaking)

× *P. serpentilingua* = *Paraphalaenopsis* × Thorntonii (Holttum) A. D. Hawkes. (Nat. hybr.)

× *P. serpentilingua* = *Paraphalaenopsis* × Sunny. 1964 (Lewis)

× *Aerides Lawrenceae* = × *Pararides* Teoh Phaik Khuan. 1968 (Teoh Eng Soon: Cheong Nam Kiong, as × *Aeridopsis* Teoh Phaik Khuan)

× *Arachnis Hookerana* = × *Pararachnis* Lee Siew Chin. 1953 (Lim Kim Hong, as × *Arachnopsis* Lee Siew Chin)

× *Euanthe Sanderana* = × *Paranthe* Jawaii. 1938 (Atherton, as × *Vandaenopsis* Jawaii)

× *Papilionanthe Hookerana* = × *Parapapilio* Amoena. 1940 (Tiggelovend, as × *Vandaenopsis* Amoena)

× *Papilionanthe teres* = × *Parapapilio* Superba. 1940 (Tiggelovend, as × *Vandaenopsis* Superba)

× *Renanthera monachica* = × *Pararenanthera* Osceola. 1971 (Jones & Scully, as × *Renanthopsis* Osceola)

× *Renanthera philippinensis* = × *Pararenanthera* Margaret. 1973 (Singapore Botanic Gardens, as × *Renanthopsis* Margaret)

× *Renanthera Storiei* = × *Pararenanthera* Firefly. 1953 (Woodlawn, as × *Renanthopsis* Firefly)

× *Vanda coerulea* = × *Paravanda Bogoriana.* 1939 (Tiggelovend, as × *Vandaenopsis Bogoriana*)

× *Vanda Dearei* = × *Paravanda* Prosperitas. 1956 (Hong, as × *Vandaenopsis* Prosperitas)

× *Vanda insignis* = × *Paravanda* Ochreata. 1941 (Tjipeganti, as × *Vandaenopsis* Ochreata)

× *Vanda lamellata* = × *Paravanda* Judith MacDougal. 1964 (Gracia Lewis, as × *Vandaenopsis* Judith MacDougal)

× *Vanda luzonica* = × *Paravanda* Charlotje de Neve. 1940 (Tjipeganti, as × *Vandaenopsis* Charlotje de Neve)

× *Vanda suavis* = × *Paravanda* Suavei. 1949 (Kirsch, as × *Vandaenopsis* Suavei)

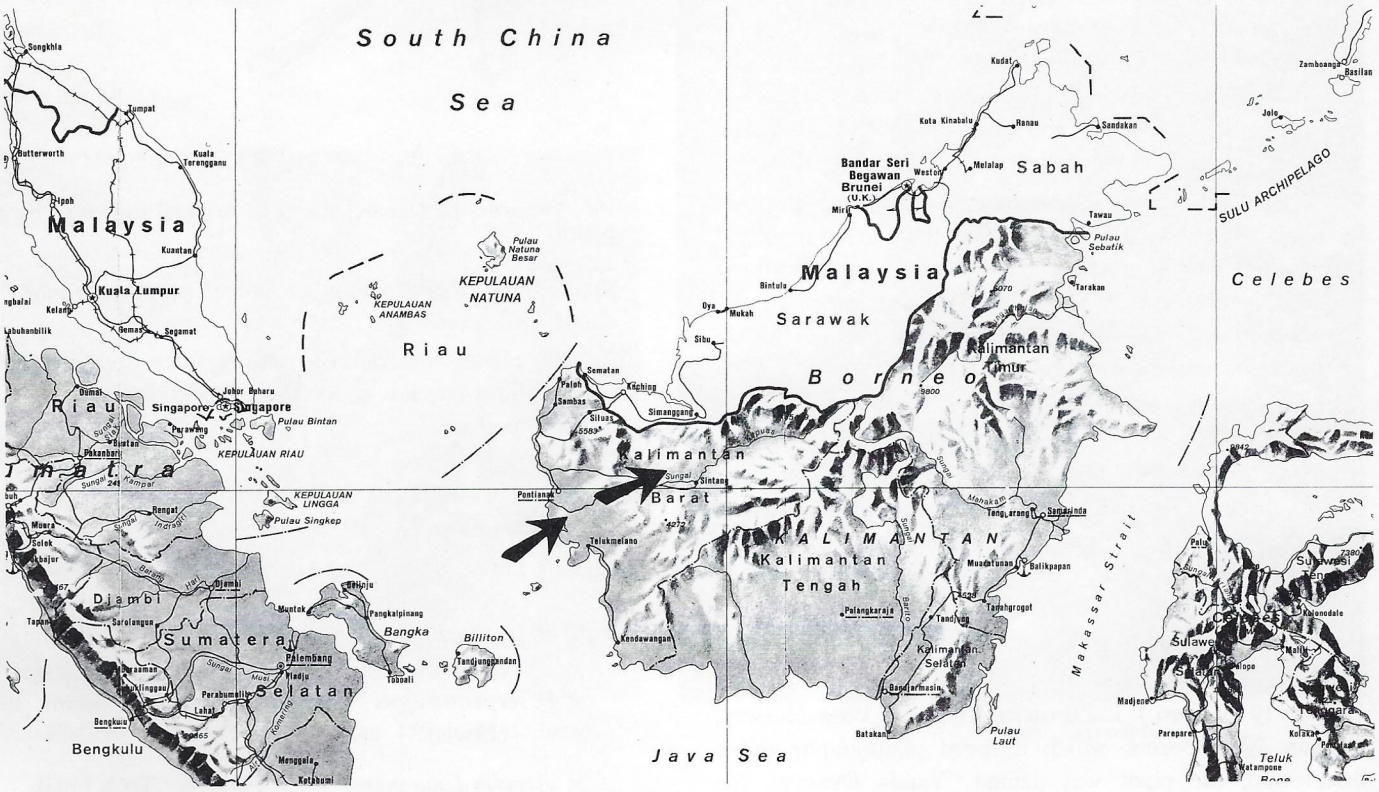
× *Vanda tessellata* = × *Paravanda* Genevieve Tan. 1970 (Thong, as × *Vandaenopsis* Genevieve Tan)

Paraphalaenopsis Laycockii (M. R. Henderson) A. D. Hawkes in Orquidea (Brazil) 25:212, [1963] 1964.

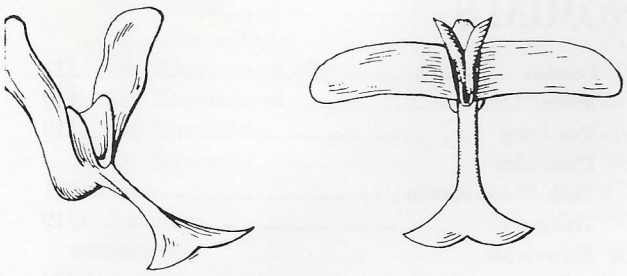
Basionym: *Phalaenopsis Laycockii* M. R. Henderson in Orch. Rev. 43:108, 1935.

Type: South Central Borneo. Imported and cultivated by J. Laycock s.n. (SING).

Epiphytic plants, pendent; aerial roots branching; stem short, few-leaved, up to 5; leaves terete with a distinct groove, up to 1 meter long, 1 cm. in diameter; inflorescence very short with a congested rachis, several-flowered, rarely up to 15; bracts ovate, acute, up to 1 cm. long; flowers pinkish mauve to lilac with yellow and brown discolorations on lip; dorsal sepal narrowly lanceolate-elliptic, acute to subacuminate, up to 4 cm. long, 1.5 cm. wide; lateral sepals obliquely ovate-lanceolate, acute, up to 4.5 cm. long, 1.7 cm. wide; petals from a fleshy cuneate base subfalcate-lanceolate, acute, up to 4 cm. long, 1.4 cm. wide; lip 3-lobed, lateral lobes erect, linear-oblong, obliquely truncate to rounded at apex, up to 1.8 cm. long, 7 mm. wide; mid-lobe porrect, linear-spathulate with a divaricately bilobed apex, lobes triangular, acute, up to 1.5 cm. long, 1.2 cm.



Map showing western Borneo where *Paraphalaenopsis Denevei* reportedly occurs from Pontianak on the west coast along the Kapuas River to about Sintang, most frequently on Meleban trees.



Lip of *Paraphalaenopsis Laycockii.*

across tip; disc with a conduplicate, quadrate callus with entire margins, pale yellow in color with transverse brown stripes; column white, stout, up to 1 cm. long; pedicellate ovary cylindric, up to 6 cm. long.

Distribution: South Central Borneo.

Illustrations: Orch. Rev. 43:109, 1935; Malayan Orch. Rev. 2(3): color plate opposite p. 97, Oct. 1936.

Observations: *Paraphalaenopsis Laycockii* was the last of the three species to be described. It is very rare and even today there are very few plants in cultivation. The whitish to light mauve- or rose-colored flowers are reported to have a fragrance of crushed lemon-grass. The sepals and petals are suffused with mauve on either side of the midvein. The suffusion is heaviest on the petals, slightly less on the lateral sepals and least on the dorsal sepal. The apex of the midlobe of the lip is similar in color to the petals shading into a reddish brown and then abruptly changing into irregular reddish brown markings at the basal third. The callus is pale yellow with rather uniform reddish brown stripes. The lateral lobes are almost white with a brown suffusion which becomes spotted basally. The inner surface of the lateral lobes have an almost white margin which shades into warm brown with spotting at the base of the lobes. The outer surface of the lateral lobes is white which becomes a pale brown and ends abruptly midway becoming a rather pale lilac. The outer surface of the midlobe basally is a light yellow. The column with the foot is white.

I have seen a flower which came in rather poor condition from Indonesia (Java) from L. K. Wie who has introduced it into cultivation.

Primary Crosses

Paraphalaenopsis Laycockii (M. R. Henderson) A. D. Hawkes

× *P. Denevei* = *Paraphalaenopsis* × Boediardjo. 1972 (Kolopaking)

× *P. serpentilingua* = *Paraphalaenopsis* × Kolopaking. 1969 (Ilgenfritz: L. K. Wie)

× *Luisia teretifolia* = × *Paraluisia** Soetan Mahmoed Latif. 1973 (Kolopaking, as × *Luinopsis* Soetan Mahmoed Latif)

Note

***Paraluisia** is a new bigeneric hybrid name proposed here. The parental generic names are *Paraphalaenopsis* × *Luisia.*

Natural Hybrid

Paraphalaenopsis × Thorntonii (Holttum) A. D. Hawkes in Phytologia 15:1, 1967.

Basionym: *Phalaenopsis* × *Thorntonii* Holttum in Orch. Rev. 74:290, 1966.

Type: West Borneo. Cult. Thornton s.n.! (K).

Syn.: *Phalaenopsis* × Sunny. 1964 (Mrs. Gracia Lewis, Singapore).

Paraphalaenopsis Denevei (J. J. Smith) A. D. Hawkes × *P. serpentilingua* (J. J. Smith) A. D. Hawkes. *Paraphalaenopsis* × *Thorntonii* is based on a plant imported by F. L. Thornton, West Palm Beach, Florida. Holttum says, "This hybrid plant resembles *P. serpentilingua* more than the other presumed parent, and may not represent a first cross between the two. It differs from both parents in having perfectly terete leaves (as reported to me by Mr. Thornton).

"The scape of the hybrid inflorescence is 6 cm. long; this is intermediate between the very short scape of *P. Denevei* and the much longer one of the other parent. In size and shape the sepals and petals of the hybrid are very near those of *P. serpentilingua* (dorsal sepal 16 mm. long), and are similarly waved and reflexed. They are rather strongly suffused pink, the edges being white, and the pink suffusion speckled with minute purple dots. *P. serpentilingua* has white sepals and petals slightly suffused with pink; in *P. Denevei* they are rather variously and much more deeply coloured, but with pale margins. The hybrid lip is coloured almost exactly as *P. serpentilingua,* and in shape of its midlobe is identical with that species; the peculiar side-lobes, with slender forward tips, are almost exactly intermediate between those of the parent species. The callus, as seen from the side, is almost quadrate, its forward end straight and vertical, while its level crest is toothed less deeply than in *P. serpentilingua;* these differences are evident when the accompanying drawing of the lip of the hybrid is compared with that of *P. serpentilingua.*

Distribution: West Borneo.

Illustration: Orch. Rev. 74:291, 1966.

Observation: An artificial, man-made cross using the same parentage has been registered in Orchid Review 72: November 1964, by Mrs. Gracia Lewis under the hybrid name of *Phalaenopsis* × Sunny.

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